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JAN 77   D S ADAMSON, E C ANDREANI, G W ARCHER   N61339-73-C-0156

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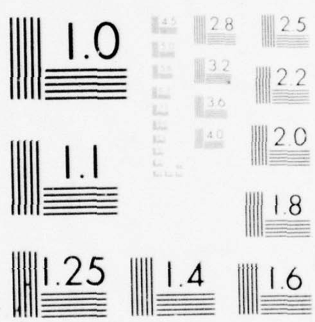

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MATHEMATICAL MODEL USER'S MANUAL
COMBINED ARMS TACTICAL TRAINING
SIMULATOR (CATTS), DEVICE 16A3

Volume IV - Section 6 and Appendix A

TRW Defense and Space Systems Group
One Space Park
Redondo Beach, California 90278
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NAVAL TRAINING EQUIPMENT CENTER
ORLANDO, FLORIDA 32813

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NAVTRAEQUIPCEN 73-C-0156-E003

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

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6. EXAMPLES AND APPLICATIONS

This section presents detailed examples of applications of the User's Manual. These example applications are described in a simple, step-by-step procedure in terms that are sufficiently detailed such that an interested programmer/analyst could modify the existing CATTS mathematical model data base (i.e., CATTS scenario) or compile a completely new data base. Included are descriptions of:

- How to input the data that defines a unit.
- How to implement a new unit type.
- How to implement a new equipment type.
- How to change the weapon effects data.
- How to change the modes of equipment operation.

Much of the information needed by the user programmer/analyst to modify or develop the CATTS data base is available in other sections of this manual as well as in other CATTS documentation such as the Data Base/Operations Manual, the Operator's Manual, and the Trainer Programming Report. The applicable sections of the User's Manual are Section 3, Definition of Terms, Section 4, Description of Data Tables; and Appendix A, Nomenclature List. Section 3 provides definitions for 163 of the major "terms" used in the model. An understanding of these terms is essential to an understanding of the intrinsic concepts inherent in the CATTS mathematical model. Section 4 provides a description of 27 of the key data tables contained in the data base. Many of these tables have a complex structure and, in several cases, there are interactions between entities in other tables. Thus, it is important that the user programmer/analyst understand the model's usage of these tables when constructing or modifying a data base scenario. Appendix A provides additional assistance by presenting a detailed definition of each of the more than 330 global variables used in the model.

The nomenclature definitions also include information to indicate whether the variable is a single-valued scalar variable or a dimensioned array. Since most of the input variables have at least one array index and, in many cases, two or three indices, the total number of input data values

necessary for a complete data base can exceed 20,000 data values. Thus, it is clear that the construction of a complete data base is certainly a non-trivial task.

It should be pointed out, here, that the aforementioned 20,000 data values are those data variables that pertain to the tactical scenario only and do not include the additional data needed to describe the attributes of military terrain; namely, relief, vegetation, soil, cultural features and the like. The current CATTS data base has a terrain data base that contains upwards of 5 million data points. The incorporation of this mass of data, in a usable form, into the CATTS data base was accomplished with the assistance of the Defense Mapping Agency (DMA). DMA provided computer tapes containing digitized data representing the terrain features in the area to be represented in the current scenario. Thus, it was not a massive manual task but was instead a relatively straightforward computer-to-computer task to produce the terrain data base portion of the overall data base. If it were desired to produce a new CATTS scenario (say, the FULDA Gap of West Germany) it would be necessary to procure the required data tapes, properly formatted, from the DMA.

Therefore, it is the intent of this section to: 1) introduce the basic concepts pertaining to the CATTS mathematical model data base organization and structure that the user must be aware of in order to modify the data base; and 2) describe the basic steps associated with changing the CATTS simulation via the data base and present specific examples of how these steps will allow the user to change the simulation.

6.1 GENERAL DATA BASE CONCEPTS

6.1.1 Data Deck Organization

As is quite usual in data driven simulation models, having large input data bases, the data is often organized into various smaller sized input decks. The CATTS data base has a total of 29 individual input decks that include all the required tactical scenario data and five computer files that contain the terrain data base. One additional file, the Pre-scheduled Events File, contains input data relating to the occurrence of specific events. This file will be discussed in Section 6.1.1.3. Insofar

as was practically possible, each of the 29 input decks was organized to facilitate the coordinated gathering and input preparation of the various classes of data that were of a generally similar nature. The 29 different input data decks are identified in Table 6-1. As shown, the decks are combined into 9 logical groupings (for discussion purposes only). The table also includes the names of the various subroutines that are called by the main model's subexecutive program (FORMAIN) to "read in" all of the necessary input data. The following sections will discuss the general content of each input deck, in each of the logical groupings, in the same order as they are presented in Table 6-1. Throughout the balance of this section there may be references to input variables by their acronym without defining the acronym. If the reader desires to know the variable's definition it is available in the alphabetized list of global variables found in Appendix A of this User's Manual.

It should be pointed out, here at the outset, that if a completely new data base were to be compiled that the user programmer/analyst(s) should make maximum use of the current CATTS data base, both as a guide and as a source of specific input data values. Much of the existing data would be applicable for other scenarios regardless of their geographical setting or composition of forces. For example, an H-Series TOE armor platoon would not change even though the geographical setting changed from the Mid East to Central Europe. Another word of caution, with respect to constructing (or modifying) a data base is that, because there is a high degree of interrelationship between various input decks, it is not necessarily true that specific entries in one input deck are sufficient to accomplish the desired effect. For example, if it is desired to add an additional unit to an existing data base, one must ensure that the Unit Type input deck includes a definition of the particular type of unit. If it does not, then an additional set of entries must be developed to describe the new unit type. Furthermore, if the new unit includes equipments (weapons) not previously included in the simulation, then new entries will be required in both Equipment Data decks. Also, new entries may be necessary in the Target Acquisition Data deck if new sensors are included. Other input decks can and probably will be affected as well. The point is, that the user must have a clear understanding of the content of each input

Table 6-1. Input Data Deck Identification

DECK NO.	INPUT DECK NAME	INPUT SUBROUTINE NAME	DATA BASE/OPNS. MANUAL APPLICABLE PAGE NOS.(1)	USER'S MANUAL APPLICABLE SECTIONS	
				SECTION 3(2)	SECTION 4(3)
	UNIT DATA				
1	Unit Description	UNINP	72	3.10, 3.14, 3.18, 3.19, 3.24, 3.31, 3.32, 3.33, 3.34, 3.35, 3.36, 3.42, 3.46, 3.60, 3.89, 3.93, 3.104, 3.105, 3.126, 3.131, 3.134, 3.135, 3.145, 3.148, 3.150, 3.151	4.21
2	Unit Type	UTINP	52	3.149, 3.153, 3.157,	4.9
	EQUIPMENT DATA				
3	Equipment	EQINP	17	3.1, 3.6, 3.8, 3.12, 3.26, 3.53, 3.54, 3.71, 3.76, 3.78, 3.81, 3.84, 3.85, 3.87, 3.111, 3.137, 3.140, 3.157, 3.158	
4	Weapon Effects	WEFINP	60	3.47, 3.159, 3.160	4.1, 4.2, 4.8

(1) The entries in this column are the page numbers in Section 3 of the CATTS Data Base/Operations Manual wherein are described the proper formatting of all input data for each of the different card types in each of the 29 individual input decks.

(2),(3) The entries in these columns are the section numbers in Sections 3 and 4 of the CATTS User's Manual wherein are described specific input variables associated with the input data deck.

Table 6-1. Input Data Deck Identification (Continued)

DECK NO.	INPUT DECK NAME	INPUT SUBROUTINE NAME	DATA BASE/OPNS. MANUAL APPLICABLE PAGE NOS.(1)	USER'S MANUAL APPLICABLE SECTIONS	
				SECTION 3(2)	SECTION 4(3)
	UNIT OPERATIONS DATA				
5	Unit Operational States (Modes)	MUINP	100	3.21, 3.85, 3.101, 3.130	4.18, 4.17, 4.26
6	Fire Support Weapons	FSINP	111	3.17, 3.29, 3.72, 3.101, 3.127	4.10
7	Fire OP State Decision	COSINP	94	3.27, 3.101, 3.130	4.12
8	Unit Movement Control	MOVINP	105	3.101	4.5, 4.19
9	Preplanned Mission Control	PPLANINP	145	3.107	
10	Unit Suppression Control	SIGINP	119	3.101, 3.133, 3.134	4.13, 4.23
	TASK ORGANIZATION DATA				
11	Operational Groups	OGINP	81	3.19, 3.24, 3.36, 3.44, 3.46, 3.56, 3.60, 3.88, 3.99, 3.100, 3.114, 3.151	4.20
12	Initial Engagements	ENGINP	92	3.49, 3.50, 3.58	

(1) The entries in this column are the page numbers in Section 3 of the CATTS Data Base/Operations Manual wherein are described the proper formatting of all input data for each of the different card types in each of the 29 individual input decks.

(2),(3) The entries in these columns are the section numbers in Sections 3 and 4 of the CATTS User's Manual wherein are described specific input variables associated with the input data deck.

Table 6-1. Input Data Deck Identification (Continued)

DECK No.	INPUT DECK NAME	INPUT SUBROUTINE NAME	DATA BASE/OPNS. MANUAL APPLICABLE PAGE NOS.(1)	USER'S MANUAL APPLICABLE SECTIONS	
				SECTION 3(2)	SECTION 4(3)
	TARGET ACQUISITION DATA				
13	Sensors	SENSINP	29	3.67, 3.68	
14	Visual Detection	SENSINP	37	3.67	
15	Aural Detection	SENSINP	41	3.67	
16	Unattended Ground Sensors	SENSINP	45	3.67	
17	Ground Radar	SENSINP	49	3.67, 3.68	
18	Target Acquisition	TAINP	58		
	DISPLAY - - GRAPHICS DATA				
19	Mine, Obstacles, Fortifications	OBFMINP	129	3.94, 3.95, 3.97	
20	Control Measures	CMINP	122	3.38, 3.39, 3.40	4.3
	LOC DATA				
21	Road	ROADINP	133	3.120, 3.121, 3.122	
22	Bridge	ROADINP	142	3.22, 3.23	

(1) The entries in this column are the page numbers in Section 3 of the CATTS Data Base/Operations Manual wherein are described the proper formatting of all input data for each of the different card types in each of the 29 individual input decks.

(2),(3) The entries in these columns are the section numbers in Sections 3 and 4 of the CATTS User's Manual wherein are described specific input variables associated with the input data deck.

Table 6-1. Input Data Deck Identification (Continued)

DECK NO.	INPUT DECK NAME	INPUT SUBROUTINE NAME	DATA BASE/OPNS. MANUAL APPLICABLE PAGE NOS.(1)	USER'S MANUAL APPLICABLE SECTIONS	
				SECTION 3(2)	SECTION 4(3)
	DISPLAY - - ALPHANUMERIC DATA				
23	Unit Menu List	MKUNLIST	87		
24	Higher & Adjacent Units	CMDUNINP	85	3.19, 3.24, 3.36, 3.41, 3.48, 3.56, 3.92, 3.114, 3.151	
25	Ammunition Names	AMMOINP	26	3.12	
26	Operational State Names	INPUT	97		
	MISCELLANEOUS DATA				
27	Miscellaneous Variable Input	INPUT	12	3.140, 3.144	
28	Miscellaneous Input	INPUT	150		
29	Namelist Input	INPUT	152	3.51, 3.53, 3.80, 3.95	

(1) The entries in this column are the page numbers in Section 3 of the CATTS Data Base/Operations Manual wherein are described the proper formatting of all input data for each of the different card types in each of the 29 individual input decks.

(2),(3) The entries in these columns are the section numbers in Sections 3 and 4 of the CATTS User's Manual wherein are described specific input variables associated with the input data deck.

deck and make a determination as to whether any other deck(s) are affected by changes or additions to any specific input deck. Table 6-1 can assist in this task since it presents a listing of input decks organized into logical groupings.

Each of the following sections will include a computer produced alphabetized list of all the variables in each input deck being discussed in the section. Each entry includes the variable name, it's index, the input deck in which it appears, and the common block in which it resides.

6.1.1.1 Unit Data

The requisite input data relative to the "units" to be included in the simulation is compiled in either the Unit Description input deck or the Unit Type input deck. Table 6-2 presents a list of the Unit Description input variables that must be defined for each of the units to be simulated. As noted, the variables define such as number of personnel, number of weapons (equipments) by type, ammunition basic loads, initial location, area occupied, and various operational parameters.

Table 6-3 presents a list of the Unit Type input variables that must be defined for each type of unit that is to be simulated. Examples of unit types defined in the current scenario include mechanized infantry, armor, armored cavalry, artillery, combat engineers, and various combat service support units.

In addition to the data of Tables 6-2 and 6-3, there are several portions of Section 3 wherein are defined a series of terms (as opposed to input variable definitions) that are of special significance to the Unit Description and Unit Type input decks. They are Sections 3.14, 3.18, 3.42, 3.46, 3.89, 3.101, 3.104, 3.105, 3.145, 3.148, 3.150, 3.152, and 3.153.

The main purpose of presenting Tables 6-2 and 6-3 in this section and the tables to follow in subsequent sections is to aid the user by providing a compact list of variables, organized into logical grouping. These variable lists when used in conjunction with the detailed definitions of Appendix A will provide the insight needed to ensure the correct specification of input variables regardless of whether the analyst is developing a complete scenario or modifying an existing scenario.

Table 6-2. Variables Belonging To Input Deck UNINP

EQINIT	(IU,J)		UNINP			BINIT
FRACTG	(IU)		UNINP			BLEFT2
FRLKOPST	(IU)		UNINP	INPUT	NAMELIST	NLOOK
IDELAY	(JU)		UNINP			BLEFT2
INCG	(IU)		UNINP			BLEFT1
IONBOARD	(IU)	(1)	UNINP			RAFTS
IOPSTU	(IU)		UNINP			BSTAT
IRAFT	(IU)	(1)	UNINP			RAFTS
ISIZE	(IU)		CMDUNINP	UNINP	OGINP	DISPLAY
ITEQU	(IU,J)		UNINP			BOBBY
ITPPL	(IU)		UNINP			DISPLAY
ITRAV	(IU)		UNINP			BLEFT1
ITYPEU	(IU)		UNINP			BSTAT
IUDEP	(IU)		UNINP			BSTAT
IUNIT	(IU)		UNINP	INPUT	NAMELIST	ROUTING
IUWID	(IU)		UNINP			BSTAT

Table 6-2. Variables Belonging To Input Deck UNINP (Continued)

IXY	(IU,J)	UNINP	BSTAT
LISTUN	(IU)	UNINP	HOWLIST
MENIN	(K,IU)	UNINP	MENI
MENNOW	(K,IU)	UNINP	MENOW
MSIZE	(IU)	UNINP	TARGETS
MVDT1	(IU)	UNINP	BLEFT2
MVDT2	(IU)	UNINP	BLEFT2
MVDT3	(IU)	UNINP	BLEFT2
MVTCD	(IU)	UNINP	BLEFT2
NAMOU	(IU)	UNINP	BOBBY
NETAMU	(IU,J)	UNINP	BOBBY
NETU	(IU)	UNINP	BOBBY
NTAMU	(IU,J)	UNINP	BOBBY
NXHGCM	(IU)	MKUNLIST UNINP	NEXTCOM
OBSDFL	(IU)	UNINP	BLEFT2
PDIR	(IU,J)	UNINP	BSTAT

Table 6-2. Variables Belonging To Input Deck UNINP (Continued)

SIGU	(JU)	UNINP	BLEFT1
TCTEQU	(IU,J)	UNINP	BCBBY
UNNAME	(I,IU)	CMDUNINP UNINP OGINP	NAMES

(1) No longer used

Table 6-3. Variables Belonging To Input Deck UTINP

AIROMU	(IUT,JCOLOR)	UTINP			C
DISMAX	(IUT)	UTINP	INPUT	NAMELIST	DISMX
HU	(IUT)	UTINP			VISUSER
HUN	(IUT) (1)	UTINP			UNKDHD
IAIRVUL	(IUT)	UTINP	INPUT	NAMELIST	VULN2AI
IDPRD	(IUT,ICOLOR)	UTINP			C
IFRNG	(IUT,J,ICOLOR)	UTINP			C
IPRNO	(IUT,K)	UTINP			C
IPWT	(IUT,J)	UTINP			C
ITAP	(IUT,ICOLOR)	UTINP			C
ITYPDW	(IUT,ICOLOR)	UTINP			C
KECMOV	(IUT,ICOLOR)	UTINP			C
MAXID	(IUT,ICOLOR)	UTINP			C
MFIGHT	(IUT,ICOLOR)	UTINP			C
NGARNG	(IUT,ICOLOR)	UTINP			C
POSFAC	(IUT,ICOLOR,IFTYP)	UTINP			C

Table 6-3. Variables Belonging to Input Deck UTINP (Continued)

RTGT	(IUT)		UTINP	VISUSER
TYPFAC	(IUT,ICOLOR)		UTINP	C
WU	(IUT)		UTINP	VISUSER
WUN	(IUT)	(1)	UTINP	UNWDHD

(1) Input via data statements in program CMAIN

6.1.1.2 Equipment Data

The mass of data required to define the performance parameters describing each equipment (weapon or non-weapon) included in the simulation is contained in either the Equipment input deck or the Weapon Effects input deck. Table 6-4 presents the variables in the Equipment input deck while Table 6-5 presents the variables in the Weapon Effects input deck.

The variables of Table 6-4 relate primarily to weapon or vehicular parameters such as rate-of-fire, rate-of-movement, fuel consumption and capacity, effective firing range, and traditional targets. The variables of Table 6-5 relate to the lethality of the various weapons for all classes of targets against which they might be employed. This deck also includes data reflecting delivery dispersion errors for fire support weapons (i.e., artillery).

Although the number of individual variables in the Weapon Effects input deck is not large (eight), the total number of data entries for this deck can be very large. For example, the IFNTB(I,J) array currently has over 700 entries while the EFFDAT(ICOEF,J) array has about 250 entries. Again, the user is urged to review the variable definitions of Appendix A and the appropriate portions of Section 4 (as noted in Table 6-1) to gain a clear understanding of the model's usage of these input variables. This knowledge is essential if a user is to attempt data base modifications.

6.1.1.3 Unit Operations Data

As indicated in Table 6-1, several of the 29 input decks have been grouped under the heading of Unit Operations Data. It is the data in these decks that allow each unit's equipments (notably the weapons) to be operated in different fashions in response to variations in the unit's tactical situation.

Primarily, it is changes in a unit's "operational state" that cause the unit to change the manner in which it uses its equipment. The input data that defines how a unit's equipment is to be used as a function of the unit's operational state is contained in the decks read in by subroutines MUINP and FSINP. Tables 6-6 and 6-7 present the variables in these two input decks. As noted in Table 6-1, certain portions of Section 4 contain

Table 6-4. Variables Belonging To Input Deck EQINP

DBEQU	(IEQ,J)	EQINP			AURALIN
DIES4KM	(IEQ)	EQINP			EQFUEL
DTMTBFI	(IEQ)	EQINP	INPUT	NAMELIST	MAINTAT
EQCAPAC	(IEQ)	EQINP			EQFUEL
EQNAME	(J,IEQ)	EQINP			NAMES
EQOVRD	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
EQWDTH	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
GAS4KM	(IEQ)	EQINP			EQFUEL
IAMTE	(IEQ,TMODE)	EQINP			A2
IECTH	(IEQ)	EQINP			FIRATH
IEQCLS	(IEQ)	EQINP	INPUT	NAMELIST	A3
IEQCOD	(IEQ)	EQINP			A1
IEQSIDE	(IEQ)	EQINP			EQSIDE
IMAXRE	(IEQ,ITGTE)	EQINP			A1
IMINRE	(IEQ)	EQINP			MINRANG
IPVCE	(IEQ,TMODE)	EQINP			A2

Table 6-4. Variables Belonging To Input Deck EQINP (Continued)

NPTE	(IEQ,J)	EQINP			A2
NSTE	(IEQ,J)	EQINP			A2
OPE	(IEQ)	EQINP			A2
PCPEC	(IEQ)	EQINP			A2
RCFE	(IEQ,TMODE)	EQINP			A2
RCME	(IEQ,TMODE)	EQINP			A2
RCMMX	(IEQ)	EQINP	INPUT	NAMELIST	MAXROM
SLPEMX	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
UBE	(IEQ)	EQINP			A2
VCI	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP

Table 6-5. Variables Belonging to Input Deck WEFINP

DISPER	(IDF,J)	WEFINP	P
EFFDAT	(ICOEF,J)	WEFINP	P
IDISPR	(IDF)	WEFINP	P
IFNTB	(I,J)	WEFINP	P
NDISPR		WEFINP	P
NFC		WEFINP	P
NPFC		WEFINP	P
NXK		WEFINP	P

Table 6-6. Variables Belonging To Input Deck MUINP

MURTAB (I,J)	MUINP	C
MUSLCT (I)	MUINP	C
NMU	MUINP	C
NRMU	MUINP	C
XMUTAB (I,J)	MUINP	C

Table 6-7. Variables Belonging To Input Deck FSINP

BANDAL	(IBDS,IBD)	FSINP	U
IBANDP	(IBDS,IBD)	FSINP	U
IBANDX	(IBDS,IBD)	FSINP	S
IENDP1	(ICOLOR)	FSINP	F
IENDP2	(ICOLOR)	FSINP	F
IENWID	(ICOLOR)	FSINP	F
IFSTAB	(I,J)	FSINP	U
ISRBF		FSINP	FCRBLK
ISRRF		FSINP	FCRBLK
IYBDS	(I,J)	FSINP	U
NFSTAB		FSINP	U
NSPVP1		FSINP	U
NSPVP2		FSINP	U

important information relating to these input data arrays. In addition, several of the "term" definitions of Section 3 will provide added insight as to the model's usage of this data. Specifically, the appropriate paragraphs of Section 3 to review are Sections 3.101, 3.85, 3.12, 3.71, 3.111, 3.105, 3.54, 3.21, 3.17, and 3.29. Because of the critical nature of these data arrays (particularly those in the Unit Operational States input deck), it is important that they be constructed or modified with great care.

The input data variables contained in the Unit OP State Decision and the Unit Movement Control input decks (see Tables 6-8 and 6-9) provide the input data that control automatic changes in a unit's operational state and movement code as the tactical situation changes. In the original MAFIA V model, these tables played a very important role; however, in the current CATTS model, they play a relatively minor role. This is because, as a general rule, changes to a unit's operational state and movement code are interactively controlled by the simulator's controllers via the Maneuver Control and Fire Control Menus. Nonetheless, selected entries in these tables may be used to relieve controller workload for those tactical situations wherein a unit would almost invariably change from operational state A to operational state B whenever condition C occurred. A similar rationale exists for the entry of data to effect changes in a unit's movement code. As noted in Table 6-1, certain portions of Section 4 contain information relating to these input data decks. In addition, Sections 3.27, 3.88, 3.89 and 3.145 contain other information relating to the definitions of specific terms. Finally, Section 5.9.3 presents a detailed explanation of the model's usage of the data contained in these input decks.

A discussion of the data variables contained in the Preplanned Mission Control input deck (see Table 6-10) should start by introducing the concept of predefined and prescheduled "events". In the CATTS model, an event is defined to mean that some change in the status of something is to occur at some future time. The list of allowable event types, any of which can be either predefined or prescheduled, is presented in Table 6-11. For example, a weather event can be constructed (via specific input data) that causes the weather to change from, say, clear weather to heavy rain. Now, the difference between a prescheduled and a predefined specific weather event

Table 6-8. Variables Belonging to Input Deck COSINP

DECVAL (ICHG)	COSINP	T
ICPTB1 (I,J)	COSINP	T
ICPTB2 (I)	COSINP	T
NBKMOV (I)	COSINP	D
NCCVAL	COSINP	T
NCPTB	COSINP	T
NSPTHR (I)	COSINP	D

Table 6-9. Variables Belonging To Input Deck MOVINP

IEXTBL	(I,J)	MOVINP	R
IXPTH	(I,IRTE)	MOVINP	I
IYPTH	(I,IRTE)	MOVINP	I
MVCHG1	(I,J)	MOVINP	R
MVCHG2	(I)	MOVINP	R
MVCHG3	(I,J)	MOVINP	R
MVDATA	(I)	MOVINP	R
NCDDP	(IRTE)	MOVINP	I
NEWVDT		MOVINP	R
NEXTB		MOVINP	R
NMVCH1		MOVINP	R
NMVCH3		MOVINP	R

Table 6-10. Variables Belonging To Input Deck PPLANINP

NAMEPLAN(I,IPPM)	PPLANINP	PPLANAM
NPPM	PPLANINP	PPLANAM
NPPREC (IPPM)	PPLANINP	PPLANRE

Table 6-11. Event Types

No.	Type
1	Weather
2	Resupply
3	Control Measures
4	Split Unit (Create DLIC's)
5	Generate Alert Message
6	Change Unit Location
7	Deactivate Units
8	Air Mission
9	Ground Maneuver
10	Ground Fire Mission
11	Unused
12	Unused
13	Unused
14	Air Defense Mission
15	Preplanned Mission
16	Task Organization

is explained as follows. Suppose, for example, that the controller wishes to have the weather change from clear to heavy rain at a specific hour during the simulation exercise. In this case, it would be necessary for the specific input data to be defined and "tagged" with the desired clock time for the event to occur. This data is then input to the data base (via the procedures outlined in Section 5.9.2) and is stored in the prescheduled events file. Then, without further action from the controller, the event will occur when the proper time is reached. A predefined weather event that called for a weather change from clear to heavy rain would have the same specific input data as a prescheduled event except that it does not have a time "tag". Also, it is not stored in the prescheduled event file but is instead input via the Preplanned Mission Control input deck. This differentiation allows the controller to access the event (through the preplanned mission command and control menu) and causes the event to occur at any time in the simulation exercise that the controller desires. Section 5.9.2 provides the detailed procedures for defining the format and content of each of the allowable event types. Several examples of selected events are also presented. The main points to remember are as follows: Predefined events are not time tagged but can be initialed by the controller at any time. Prescheduled events must be time tagged and will occur at that time without further controller action. Predefined events are input via entries in the Preplanned Mission Control input deck. Prescheduled events are input via other means and stored in the Prescheduled Events File as described in Section 5.9.2. Predefined events will occur only if the controller takes positive action to initiate them. Prescheduled events, once defined, cannot be stopped from occurring.

The input data variables contained in the Unit Suppression Control input deck (see Table 6-12) provides the input data that controls the degree of suppression occurring in a unit as the tactical situation varies. Sections 4.13 and 4.23 provide detailed information for the variables ISSLCT(I) and SIGTAB(I,J), respectively. Sections 3.133 and 3.134 provide definitions of suppression criteria and suppression effects, respectively. The user is advised to review these sections before attempting to develop or modify input data for the Unit Suppression Control input deck.

Table 6-12. Variables Belonging To Input Deck SIGINP

ISSLCT (I)	SIGINP	C
NSGSLT	SIGINP	O
NSGTAB	SIGINP	C
SICTAB (I,J)	SIGINP	O

6.1.1.4 Task Organization Data

The input variables contained in the Operational Group input data deck (see Table 6-13) consist of the input data necessary to specify the activities of operational groups. The definition of an operational group as a collection of units acting in concert is explained in detail in Sections 3.99, 3.100, and 3.141. Added information relative to the development of input data for operational group movement data is presented in Section 4.20.

The particular variables IDWENG, FECFAC, HLFRN, and IREENG do not play as prominent a role in the CATTS model as they did in the original MAFIA V model. The reason for this is that a large portion of the model's automatic engagement logic (the portion where these variables are used) is by-passed in the current CATTS scenario. This by-passing results from the fact that the variables NGARNG and MFIGHT (see Unit Type input deck) are currently initialized to zero. Nonetheless, a specific value must be input for the aforementioned four variables (a 1 is acceptable) for successful model initialization. Operational groups may be formed via data entries in the Operational Group input deck or through use of the Task Organization menu from the controller's console at any time during the simulation exercise. These latter procedures are outlined in the CATTS Operator's Manual.

The single variable noted in Table 6-14 as belonging to the Initial Engagements input deck is a holdover from the original MAFIA V model. In the CATTS model, it must be initialized to zero to successfully initialize the model.

6.1.1.5 Target Acquisition Data

The data included in the Sensors, Visual Detection, Aural Detection, Unattended Ground Sensors (UGS), and Ground Radar input decks (see Table 6-15) consists primarily of that data necessary to define the performance parameters of the various types of target acquisition devices as well as selected data related to the operational usage of the devices. Several term definitions that present information relevant to target acquisition sensors are presented in Sections 3.67, 3.68, 3.146, and 3.147. With the exception of the UGS devices, the sensors are defined as a particular

Table 6-13. Variables Belonging To Input Deck OGINP

DPMVT	(IDPG,J)	OGINP	G
FECFAC	(IDPG)	OGINP	G
HLFRN	(IDPG)	OGINP	G
IDPCOD	(IDPG)	OGINP	G
IDWENG	(IDPG)	OGINP	G
ICGTYP	(IDPG)	OGINP	G
IREENG	(IDPG)	OGINP	G
ISIZE	(IU)	CMDUNINP UNINP OGINP	DISPLAY
ITRAVG	(IDPG)	OGINP	G
MTCODG	(IDPG)	OGINP	G
MVDTA1	(IDPG)	OGINP	G
MVDTA2	(IDPG)	OGINP	G
MVDTA3	(IDPG)	OGINP	G
NCG		OGINP	G
NRCG		OGINP	G
NRCGP1		OGINP	G
UNNAME	(I,IU)	CMDUNINP UNINP OGINP	NAMES

Table 6-14. Variables Belonging To Input Deck ENGINP

NNGAGE	ENGINP	F

Table 6-15. Variables Belonging To Input Deck SENSINP

ALERTFAC(I)	SENSINP	VISUALI
ALLEVEL (I)	SENSINP	VISUAL
AMAX	SENSINP	DUSER
AMINFC	SENSINP	DUSER
ARANGE	SENSINP	AURALIN
ATER	SENSINP	AURALIN
BNLD	SENSINP	AURALIN
BNLN	SENSINP	AURALIN
CONSMAC (I)	SENSINP	AURALIN
DBDIFF	SENSINP	AURALIN
DELT	SENSINP	VISUSER
DUHTFAC	SENSINP	DISMOUN
DUWIFAC	SENSINP	DISMOUN
FIRFC	SENSINP	DUSER
FPCON (I)	SENSINP	VISUALI
IDBRAIN (IWC,J)	SENSINP	RAINDBF

Table 6-15. Variables Belonging To Input Deck SENSINP (Continued)

IGRADSEN(IGSR)	SENSINP	RADARCC
ISENNT (IGS)	SENSINP	SENSTYP
ISPRNC (J,IGS)	SENSINP	SENSPRI
IUASFT (IUGS,ICOLOR)	SENSINP	UASF
LLLN	SENSINP	VISUSER
MNRSUT	SENSINP	RADARCC
NGSR	SENSINP	RADARCC
NINF	SENSINP	VISUSER
NCLAS (ICOLOR)	SENSINP	UASF
NRTGTS (IUST)	SENSINP	TARGETS
RDCA (IGSR)	SENSINP	RADARCC
RDCB (IGSR)	SENSINP	RADARCC
RDCC (IGSR)	SENSINP	RADARCC
RDCTMN (IGSR)	SENSINP	RADARCC
RDCTMX (IGSR)	SENSINP	RADARCC
RMAX	SENSINP	DUSER

Table 6-15. Variables Belonging To Input Deck SENSINP (Continued)

RNM	SENSINP		
RNOD	SENSINP		VISUSER
ROMMAX	SENSINP	INPUT NAMELIST	VISUSER
RSLS	SENSINP		VISUSER
RTTABLE (K,I)	SENSINP		VISUALI
SCANFAC	SENSINP		VISUALI
SIGRADMX	SENSINP	INPUT NAMELIST	RADARCO
SOIL (ISOIL,J)	SENSINP		SOILIN
SR	SENSINP		VISUSER
SSV	SENSINP		VISUSER
TCTABLE (I,J)	SENSINP		VISUSER
THS	SENSINP		AURALIN
TSTEPSEC	SENSINP		VISUALI
TVS2CON (I,J)	SENSINP		VISUALI
TVS2MAX (I)	SENSINP		VISUALI
TVS2MIN (I)	SENSINP		VISUALI
TVS4CON (I)	SENSINP		VISUALI

Table 6-15. Variables Belonging To Input Deck SENSINP (Continued)

TVS4MAX		SENSINP	VISUALI
TVS4RCON		SENSINP	VISUALI
UASFRS	(IUGS,ICOLOR)	SENSINP	UASF
UASFX	(IUGS,ICOLOR)	SENSINP	UASF
UASFY	(IUGS,ICOLOR)	SENSINP	UASF
UASNAME	(I,IUGST)	SENSINP	UASF
UASTRS	(IUGST,I)	SENSINP	UASF
VEG	(IVEG,J)	SENSINP	VEGVIS
VMAX		SENSINP	DUSER
VRB6		SENSINP	VISUSER
VRB7		SENSINP	VISUSER
VRE		SENSINP	VISUSER
WNI		SENSINP	AURALIN

equipment type and are associated with selected units in the same manner as are trucks, for example. The UGS, on the other hand, are associated with the area of operations in a global sense, thus, it is necessary that the UGS field coordinates be specified via the input variables UASFX and UASFY.

The data included in the Target Acquisition input deck (see Table 6-16) is another holdover from MAFIA V. It is not used at all in CATTS and all reference to it should be eliminated from the current CATTS model. However, since it has not been eliminated, as yet, dummy input data must be input via this input deck for successful model initialization.

6.1.1.6 Obstacle/Control Measure Data

The data input via the Mine Obstacle Fortification input deck generally relates to the size and location of the allowable types of obstacles. In addition, as noted in Table 6-17, the specification of several variables that are actually input by subroutine INPUT from the Namelist input deck is required. Although really part of another input deck they are collected in Table 6-17 since they relate to the model's operations with respect to unit's encounters with obstacles. The variable definitions of Appendix A provide information of value to the analyst when constructing or adding to the CATTS data base. See also, Sections 3.94, 3.95, 3.96, and 3.97. The Control Measures input deck contains the variables required to define the model's control measures (see Table 6-18). The primary data in this deck is the variable ICM(J,ICM). It is this variable that specifies the type of control measure (point, line, or area) and the class within the given type. It also defines the location in terms of X-Y coordinates for as many points as are required to define the extent of the control measure. Section 4.3 and Sections 3.38, 3.39, and 3.40 should be reviewed for added information as to the precise format and content of this input data deck.

The development of a set of NAMELIST input for minefields can be accomplished by several methods. The only complication involved is that some of the variables are packed, yet Xerox NAMELIST accepts only decimal integer representations. This leaves the user the alternatives of performing some tedious manual calculations, or of exploiting some features of the CATTS model to automate these calculations.

Manual data packing calculations are performed as follows:

$$\text{The desired value } V = \sum_{i=1}^{n} P_i D_i$$

where

n = number of packed quantities to store $1 \leq n \leq 4$

P_i = decimal integer value to be stored

D_i = displacement value

The proper displacement value depends on where P_i is to te stored. If we number the four bytes of a computer word as 1 to 4 from left to right, and the two halfwords as 1 to 2 left to right, then the value of D_i is given as follows:

P_i Stored as	Value of D_i
Byte 1	16777216
Byte 2	65536
Byte 3	256
Byte 4	1
Halfword 1	65536
Halfword 2	1

The only problems with performing the packing calculations manually are the time consumed and the risk of making a mistake and entering an incorrect value which could degrade simulation results, yet be difficult to detect. The user is reminded that the maximum value which may be stored in a byte is 255; in a halfword, 32767.

Automated packing of minefield data will be performed automatically by the math model input routine MINEFLDS. This routine will print out the packed data in NAMELIST-readable format if the user-set input flag IØBSFLAG is set such that 128 $\leq$ IOBSFLAG $\leq$ 255. Thus, a minefield input deck can be prepared in the normal way; the model run with IOBSFLAG = 128 and the proper switches set to cause reading of these decks (it is not necessary to perform an exercise, merely to allow the model to read the input decks and complete initialization as described in the Data Base

Table 6-16. Variables Belonging To Input Deck TAINP

ADTPR	(IUNTYP,ICOLOR,K)	TAINP	C
NCURV		TAINP	D
NPPRT		TAINP	
PRTB		TAINP	

Table 6-17. Variables Belonging To Input Deck OBFMINP

BEYOND	OBFMINP	INPUT	NAMELIST	PASSOBS
ENGRFCTR(IOBST)	OBFMINP	INPUT	NAMELIST	ENGFACT
IOBONOFF	OBFMINP	INPUT	NAMELIST	OBSONOF
IOBRB (IOBS)	OBFMINP			OBSDATA
IOBSFLAG	OBFMINP	INPUT	NAMELIST	OBSONOF
IOBSTYPE(IOBS)	OBFMINP			OBSDATA
IOBWIDTH(IOBS)	OBFMINP			OBSDATA
IOBX (I,IOBS)	OBFMINP			OBSDATA
IOBY (I,IOBS)	OBFMINP			OBSDATA
MAXWRKF (IOBST)	OBFMINP	INPUT	NAMELIST	ENGRWOR
MOFNAME (I,IOBS)	OBFMINP			OBSDATA
MSEG (I,JOBS)	OBFMINP			MSEGMT
MSEGMENT	OBFMINP			ODIST
NOB	OBFMINP			OBSDATA
NSEG	OBFMINP			MSEGMT
NSEGMT (IOBS)	OBFMINP			OBSDATA
TASK (IOBST)	OBFMINP	INPUT	NAMELIST	ENGFACT

Table 6-18. Variables Belonging To Input Deck CMINP

ICM (J,ICM)	CMINP	CM
ICMBREAK(ICMT)	CMINP	CMNAME
LABELCM (ICMT)	CMINP	CMNAME
NAMECM (J,ICMT)	CMINP	CMNAME
NLINES	CMINP	
NOCMT	CMINP	CM
NPOINTS	CMINP	

Table 6-19. Variables Belonging To Input Deck ROADINP

BDMGTHRS	ROADINP	DAMAGE
IBRGSPAN(IBR)	ROADINP	BRIDGES
IBRGTYPE(IBR)	ROADINP	BRIDGES
IBRGWDTH(IBRT)	ROADINP	BRIDGES
IBRIDGEX(IBR,M)	ROADINP	BRIDGES
IBRIDGEY(IBR,M)	ROADINP	BRIDGES
IRDNPTS (IRD)	ROADINP	ROADS
IRDTYPE (IRD)	ROADINP	
IRDWDTH (IRDT)	ROADINP	ROADS
IROADX (IRDSG)	ROADINP	ROADS
IROADY (IRDSG)	ROADINP	ROADS
NBRIDGE	ROADINP	BRIDGES
NROADS	ROADINP	ROADS
RDMGTHRS	ROADINP	DAMAGE

input decks and complete initialization as described in the Data Base Operations Manual) and the necessary packed values extracted from the data printout created.

6.1.1.7 LOC Data

The data input from the Road and Bridge input data decks by Subroutine ROADINP contains the input variables of Table 6-19. For the case of roads, this data includes the road type, road width, and sufficient X-Y coordinate sets to define the desired extent of the road. The bridge input data includes the bridge type, bridge width, and the X-Y coordinates of its end points. See also Sections 3.22, 3.23, 3.120, 3.121, and 3.122 for additional information.

6.1.1.8 Display - - Alphanumeric Data

The input data contained in the input data decks of this grouping (see Table 6-1) provides that data needed by some of the menus presented on the video monitor display. The variables are identified in Tables 6-20 through 6-22. As a general rule, the only use made of this data is to cause alphanumeric names to be written out in various portions of selected menus. Several paragraphs of Section 3 provide additional information as to the input of and the use of this data. Specifically, see Sections 3.56, 3.82, and 3.92.

6.1.1.9 Miscellaneous Data

The input data decks in this grouping include the Miscellaneous Variable, the Miscellaneous, and the Namelist input decks, see Table 6-23. This data, read in by Subroutine INPUT, consists of a wide variety of input data classes. Appendix A provides a definition of each of the listed variables. The variables of Table 6-23 are in some cases, bookkeeping type variables, others are for debug printout control, while still others are required for combat simulation operations by the math model. For this latter class, an attempt has been made to identify, in the table, the input data deck with which the variable is most-closely associated. For example, the variable BEYOND is associated with the input data deck read in by Sub-

routine OBFMINP. This is because the input data for BEYOND is used by the math model's obstacle submodule. Other examples of this nature include DISMAX, DTMTBFI, and so forth. The rationale for the use of this namelist data input technique is well documented in Section 4 of the CATTS Data Base/Operations Manual.

Tables 6-24 and 6-25 each present a list of variables that are subsets of the variables of Table 6-23. Table 6-24 includes those variables that are compiled in the Miscellaneous Variable Input deck while Table 6-25 includes those variables that are compiled in the Namelist Input deck.

Table 6-20. Variables Belonging to Input Deck MKUNLIST

IFSTBLU	MKUNLIST	
LASTBLU	MKUNLIST	
NXHGCM (IU)	MKUNLIST UNINP	NEXTCOM

Table 6-21. Variables Belonging to Input Deck CMDUNINP

ISIZE	(IU)	CMDUNINP	UNINP	DGINP	DISPLAY
UNNAME	(I,IU)	CMDUNINP	UNINP	DGINP	NAMES

Table 6-22. Variables Belonging To Input Deck AMMOINP

IAMMONAM(M,IAMMO)	AMMOINP	AMMONAM
IAMOSIDE(IEQ)	AMMOINP	EQSIDE
NUMAMO	AMMOINP	AMMONAM

Table 6-23. Variables Belonging To Input Deck INPUT

AMOREV	INPUT NAMELIST	REVEAP
AMPHBUS	INPUT NAMELIST	ENGFACT
BEYOND	OBFMINP INPUT NAMELIST	PASSOBS
CPDEADP	INPUT NAMELIST	CPDEAD
CPDEADV	INPUT NAMELIST	CPDEAD
DELMNT	INPUT NAMELIST	REVEQP
DELMOVE	INPUT NAMELIST	REVEQP
DENSITY (IVEG)	INPUT NAMELIST	TREEDTA
DFMIRF	INPUT NAMELIST	VISIBLE
DIAMTER (IVEG)	INPUT NAMELIST	TREEDTA
DISMAX (IUT)	UTINP INPUT NAMELIST	DISMX
DTMTBFI (IEC)	ECINP INPUT NAMELIST	MAINTAT
ENGRFCTR(IOBST)	OBFMINP INPUT NAMELIST	ENGFACT
EQCVRD (IEC)	ECINP INPUT NAMELIST	EQUIP
EQWDTH (IEC)	ECINP INPUT NAMELIST	EQUIP
FREXOPST(IOPST)	INPUT NAMELIST	TARGETS

Table 6-23. Variables Belonging To Input Deck INPUT (Continued)

FRLKOPST(IU)	UNINP	INPUT	NAMELIST	NLOOK
GAF1	INPUT	NAMELIST		GAFACTS
IAIRVUL (IUT)	UTINP	INPUT	NAMELIST	VULN2AI
IBFLAG	INPUT	NAMELIST		ENGRWOR
IBTASKS	INPUT	NAMELIST		ENGRWOR
IBUILD	INPUT	NAMELIST		ENGRWOR
IDMVLTST	INPUT	NAMELIST		DISTMCV
IDCSTART	INPUT	NAMELIST		
IDOSTAT	INPUT	NAMELIST		STATDAT
IDTIME	INPUT	MISCVAR		
IEQCLS (IEC)	ECINP	INPUT	NAMELIST	A3
INTRVL (I)	INPUT	MISCVAR		STCPC
ICBONOFF	CBFMINP	INPUT	NAMELIST	OBSONOF
ICBSFLAG	CBFMINP	INPUT	NAMELIST	CBSCNOF
IOCOD (I)	INPUT	MISCVAR		E
ICDEGR	INPUT	NAMELIST		PRINTER

Table 6-23. Variables Belonging To Input Deck INPUT (Continued)

IOINTRVL(I)	INPUT	NAMELIST	IOFLAGS
IOPTST	INPUT	NAMELIST	DISMX
IOSTART	INPUT	NAMELIST	
IPOFNA	INPUT	NAMELIST	MOUNTCO
IPOSFW	INPUT	NAMELIST	MOUNTCO
IRATT	INPUT	NAMELIST	ROUTING
IRECOVER	INPUT	NAMELIST	
IREDAMMO	INPUT	NAMELIST	
IRTASKS	INPUT	NAMELIST	ENGRWOR
ISOILTYP	INPUT	NAMELIST	DUMMYLD
ISRCOD (I)	INPUT	MISCVAR	
ISSTOP (I)	INPUT	MISCVAR	STOPC
ITIMCHK	INPUT	NAMELIST	TIMCHK
ITIME	INPUT	MISCVAR	FORBLK
ITIMX	INPUT	MISCVAR	FORBLK
IUNIT (IU)	UNINP INPUT	NAMELIST	ROUTING
IUNTFIR (J,J)	INPUT	NAMELIST	

Table 6-23. Variables Belonging To Input Deck INPUT (Continued)

IUSTOP (I)	INPUT	MISCVAR	STOPC
IVEGCLAS	INPUT	NAMELIST	DUMMYLD
IWANTAIR	INPUT	NAMELIST	
IWCLS	INPUT	NAMELIST	WEATHR
IWPNFIR (K,K)	INPUT	NAMELIST	
LCSFAKE	INPUT	NAMELIST	DUMMYLD
MAXBTASK	INPUT	NAMELIST	ENGFACT
MAXRTASK	INPUT	NAMELIST	ENGFACT
MAXWRKF (IOBST)	CBFMINP INPUT	NAMELIST	ENGRWOR
MHOWSEND	INPUT	NAMELIST	ALRTPRO
MNREDCON	INPUT	NAMELIST	
MNSECNDS	INPUT	NAMELIST	
MOVEDEGR	INPUT	NAMELIST	DGRCNDF
MXRDIST	INPUT	NAMELIST	RCADIST
NDAYE	INPUT	NAMELIST	ETIME
NDAYEMN1	INPUT	NAMELIST	DAYLESS

Table 6-23. Variables Belonging To Input Deck INPUT (Continued)

NEQUIP	INPUT	MISCVAR	FORBLK
NEVENT	INPUT	NAMELIST	
NFDU	INPUT	NAMELIST	AIRU
NHOURE	INPUT	NAMELIST	ETIME
NLDU	INPUT	NAMELIST	AIRU
NMODES	INPUT	MISCVAR	FORBLK
NOALERTS	INPUT	NAMELIST	ALRTFLG
NODEADCP	INPUT	NAMELIST	CPDEAD
NPRWT	INPUT	MISCVAR	FORBLK
NPVC	INPUT	MISCVAR	FORBLK
NRU	INPUT	MISCVAR	FORBLK
NRUP1	INPUT	NAMELIST	FORBLK
NUMCNTPL	INPUT	NAMELIST	CONTRLR
NUNIT	INPUT	MISCVAR	FORBLK
NUNTYP	INPUT	MISCVAR	FORBLK
REVDIES	INPUT	NAMELIST	REVEQP
REVGAS	INPUT	NAMELIST	REVEQP

Table 6-23. Variables Belonging To Input Deck INPUT (Continued)

ROMMAX		SENSINP	INPUT	NAMELIST	VISUSER
ROMMX	(IEC)	EQINP	INPUT	NAMELIST	MAXROM
SIGRADMX		SENSINP	INPUT	NAMELIST	RADARCC
SLPEMX	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
TASK	(IOBST)	OBFMINP	INPUT	NAMELIST	ENGFACT
TSR		INPUT	NAMELIST		WTHDAT
TSS		INPUT	NAMELIST		WTHDAT
VCI	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
VSDEG1		INPUT	NAMELIST		VISIBLE
VSDEG2		INPUT	NAMELIST		VISIBLE
WDAY	(I,J)	INPUT	NAMELIST		WTHDAT
WPVC	(IPVC)	INPUT	MISCVAR		D

Table 6-24. Variables Belonging To Input Deck MISCVAR

IDTIME		INPUT	MISCVAR	
INTRVL	(I)	INPUT	MISCVAR	STOPC
IOCOD	(I)	INPUT	MISCVAR	E
ISRCOD	(I)	INPUT	MISCVAR	
ISSTOP	(I)	INPUT	MISCVAR	STOPC
ITIME		INPUT	MISCVAR	FORBLK
ITIMX		INPUT	MISCVAR	FORBLK
IUSTOP	(I)	INPUT	MISCVAR	STOPC
NEQUIP		INPUT	MISCVAR	FORBLK
NMODES		INPUT	MISCVAR	FORBLK
NPRWT		INPUT	MISCVAR	FORBLK
NFVC		INPUT	MISCVAR	FORBLK
NRL		INPUT	MISCVAR	FORBLK
NUNIT		INPUT	MISCVAR	FORBLK
NURTYP		INPUT	MISCVAR	FORBLK
[illegible]	[illegible]	INPUT	MISCVAR	D

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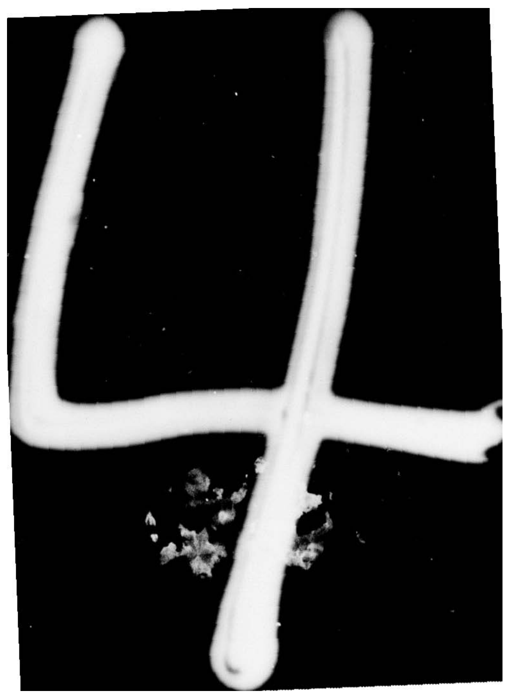
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Table 6-25. Variables Belonging To Input Deck NAMELIST

AMCREV	INPUT NAMELIST	REVEAP
AMPHBUS	INPUT NAMELIST	ENGFACT
BEYOND	OBFMINP INPUT NAMELIST	PASSOBS
CPDEADP	INPUT NAMELIST	CPDEAD
CPDEADV	INPUT NAMELIST	CPDEAD
DELMNT	INPUT NAMELIST	REVEOP
DELMOVE	INPUT NAMELIST	REVEOP
DENSITY (IVEG)	INPUT NAMELIST	TREEDTA
DFMIRF	INPUT NAMELIST	VISIBLE
DIAMTER (IVEG)	INPUT NAMELIST	TREEDTA
DISMAX (IUT)	UTINP INPUT NAMELIST	DISMX
DTMTBFI (IEQ)	EQINP INPUT NAMELIST	MAINTAT
ENGRFCTR(IOBST)	OBFMINP INPUT NAMELIST	ENGFACT
EQCVRD (IEQ)	EQINP INPUT NAMELIST	EQLIP
EQWDTH (IEQ)	EQINP INPUT NAMELIST	EQLIP
FREXOFST(IOPST)	INPUT NAMELIST	TARGETS

Table 6-25. Variables Belonging To Input Deck NAMELIST (Continued)

FRLKOPST(IU)	UNINP	INPUT	NAMELIST	NLOCK
GAF1	INPUT	NAMELIST		GAFACTS
IAIRVUL (IUT)	UTINP	INPUT	NAMELIST	VULN2AI
IBFLAG	INPUT	NAMELIST		ENGRWCR
IBTASKS	INPUT	NAMELIST		ENGRWOR
IBUILD	INPUT	NAMELIST		ENGRWOR
IDMVLTST	INPUT	NAMELIST		DISTMOV
IDOSTART	INPUT	NAMELIST		
IDCSTAT	INPUT	NAMELIST		STATDAT
IECCLS (IEC)	EQINP	INPUT	NAMELIST	A3
IOBONOFF	OBFMINP	INPUT	NAMELIST	CBSCNCF
ICBSFLAG	CBFMINP	INPUT	NAMELIST	CBSCNCF
ICDEGR	INPUT	NAMELIST		PRINTER
IOINTRVL(I)	INPUT	NAMELIST		ICFLAGS
IOPTST	INPUT	NAMELIST		DISMX
IOSTART	INPUT	NAMELIST		

Table 6-25. Variables Belonging To Input Deck NAMELIST (Continued)

IPDFNA	INPUT NAMELIST	MOUNTCO
IPDSFW	INPUT NAMELIST	MOUNTCO
IRATT	INPUT NAMELIST	ROUTING
IRECOVER	INPUT NAMELIST	
IREDAMMO	INPUT NAMELIST	
IRTASKS	INPUT NAMELIST	ENGRWOR
ISOILTYP	INPUT NAMELIST	DUMMYLD
ITIMCHK	INPUT NAMELIST	TIMCHK
IUNIT (IU)	UNINP INPUT NAMELIST	ROUTING
IUNTFIR (J,J)	INPUT NAMELIST	
IVEGCLAS	INPUT NAMELIST	DUMMYLD
IWANTAIR	INPUT NAMELIST	
IWCLS	INPUT NAMELIST	WEATHR
IWPNFIR (K,K)	INPUT NAMELIST	
LOSFAKE	INPUT NAMELIST	DUMMYLD
MAXBTASK	INPUT NAMELIST	ENGFACT
MAXRTASK	INPUT NAMELIST	ENGFACT

Table 6-25. Variables Belonging To Input Deck NAMELIST (Continued)

MAXWRKF (IOBST)	OBFMINP INPUT NAMELIST	ENGRWOR
MHOWSEND	INPUT NAMELIST	ALRTPRC
MNREDCON	INPUT NAMELIST	
MNSECNDS	INPUT NAMELIST	
MOVEDEGR	INPUT NAMELIST	DGRCNOF
MXRDIST	INPUT NAMELIST	RCADIST
NDAYE	INPUT NAMELIST	ETIME
NDAYEMN1	INPUT NAMELIST	DAYLESS
NEVENT	INPUT NAMELIST	
NFDU	INPUT NAMELIST	AIRL
NHOURE	INPUT NAMELIST	ETIME
NLDU	INPUT NAMELIST	AIPL
NOALERTS	INPUT NAMELIST	ALRTFLG
NCDEADCP	INPUT NAMELIST	CFDEAD
NRLP1	INPUT NAMELIST	FCRBLK
NUMCNTRL	INPUT NAMELIST	PCNTRLR

Table 6-25. Variables Belonging To Input Deck NAMELIST (Continued)

REVDIES		INPUT	NAMELIST		REVEQP
REVGAS		INPUT	NAMELIST		REVEQP
ROMMAX		SENSINP	INPUT	NAMELIST	VISUSER
ROMMX	(IEQ)	EQINP	INPUT	NAMELIST	MAXROM
SIGRADMX		SENSINP	INPUT	NAMELIST	RADARCD
SLPEMX	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
TASK	(IOBST)	OBFMINF	INPUT	NAMELIST	ENGFACT
TSR		INPUT	NAMELIST		WTHDAT
TSS		INPUT	NAMELIST		WTHDAT
VCI	(IEQ)	EQINP	INPUT	NAMELIST	EQUIP
VSDEG1		INPUT	NAMELIST		VISIBLE
VSDEG2		INPUT	NAMELIST		VISIBLE
WDAY	(I,J)	INPUT	NAMELIST		WTHDAT

6.1.2 Data Base Input Data Deck Sequence

A detailed description of the procedures for inputting the data base scenario data contained in the 29 input data decks discussed in the previous section, as well as the five separate files containing terrain data and the one prescheduled events data file, is presented in Section 5.7 of this User's Manual.

The order in which the 29 input data decks must be sequenced is shown in Table 6-26. It should be noted that this sequence is not the same as that shown in Table 6-1. The sequence and grouping of input decks, as in Table 6-1, was done merely to facilitate the discussion of Section 6.1.1.

6.1.3 Data Base Modifications

The previous section has presented a series of detailed tables (one for each input deck) identifying each of the individual input variables that must be defined for the specific class of data input via the particular input deck. As previously noted, there are in excess of 330 different variables and since many of them are multi-dimensioned there are about 20,000 individual data values. This total of 20,000 results from the fact that the current CATTS scenario contains 99 units, 80 equipment classes, and 11 unit types as well as several other multi-dimensioned elements.

The nature of the input data format structure and the input data disk file storage design are such that minor modifications (replacements, insertions, and/or deletions) to the data base would require that the entire input data deck of over 4000 cards be "read in" every time a change was made. Since this is quite costly in terms of both time and computer usage a specialized data base editor program was developed. This special editor allows data base changes to be made with a minimum of both analyst effort and computer usage. A description of its functioning and procedures for its use are presented in Section 4.2.1 of the CATTS Data Base/Operations Manual. In addition, a second even more specialized editor is available for the purpose of making changes to the extensive weapon effects input data base. This editor is described in Section 4.2.2 of the above reference. The basic advantage of both of these editors is that each allows modifications to be made to the data base by reading in only as many data cards as are required to define the new data instead of having to read in the entire data deck of over 4000 input data cards.

Table 6-26. Input Data Deck Sequence

1	Miscellaneous Variable Input Deck
2	Equipment Input Deck
3	Ammunition Name Input Deck
4	Sensors Input Deck
5	Visual Detection Input Deck
6	Aural Detection Input Deck
7	Unattended Ground Sensors Input Deck
8	Ground Radar Input Deck
9	Unit Type Input Deck
10	Target Acquisition Input Deck
11	Weapon Effects Input Deck
12	Unit Description Input Deck
13	Operational Group Input Deck
14	Higher & Adjacent Units Input Deck
15	Unit Menu List Input Deck
16	Initial Engagements Input Deck
17	Unit OP State Decision Input Deck
18	Operational State Name Input Deck
19	Unit Operational States Input Deck
20	Unit Movement Control Input Deck
21	Fire Support Control Input Deck
22	Unit Suppression Control Input Deck
23	Control Measures Input Deck
24	Mine Obstacles Fortifications Input Deck
25	Road Input Deck
26	Bridge Input Deck
27	Preplanned Mission Control Input Deck
28	Miscellaneous Input Deck
29	Namelist Input Deck

6.2 DATA BASE MODIFICATION PROCEDURE AND EXAMPLES

6.2.1 Nine Basic Steps for Changing the Data Base

There are nine (9) basic steps associated with changing the CATTS simulation via the CATTS data base. These 9 steps are depicted in Figure 6-1 and represent a procedure whereby someone fairly new to CATTS will be able to solve the problem of identifying the proper variables and how they are used (and where the places are on the data base file that correlate with the variables) in order to implement desired changes in the CATTS simulation via changes in the data base are presented in Section 6.2.2.

Step 1: Need for change identified.

This includes simple items like discovering that a unit has an incorrect number of personnel, or the controllers requesting a control measure be moved. Also included are more complex things like the Army wanting to update all red units and equipments to reflect more realistic and current TOE (Table of Organization and Equipment) information.

Step 2: Identify the variables that must be changed (and how they are used).

For those new to the model, this is by far the most difficult step. Changing the data to cause changes in the simulation is complicated and a bit tricky, and without a certain amount of knowledge and training, it simply can't be done. A certain minimal knowledge of the CATTS math model operation is therefore necessary before one can begin changing data.

Considering that a large part of the CATTS data base is used in a very straightforward manner (e.g., data on how many men a unit has, how much and what kind of equipment each unit has, etc.), the user is presented with the problem of locating all of the places on the data base file that need to be changed. Several places to begin the search are available; one is Table 6-1 of this User's Manual, while others are the tables of contents of the User's Manual and the Programming Report. Also, Table 6-27 can be used in conjunction with programs SORT and LIST described in Appendix A of this User's Manual. Looking

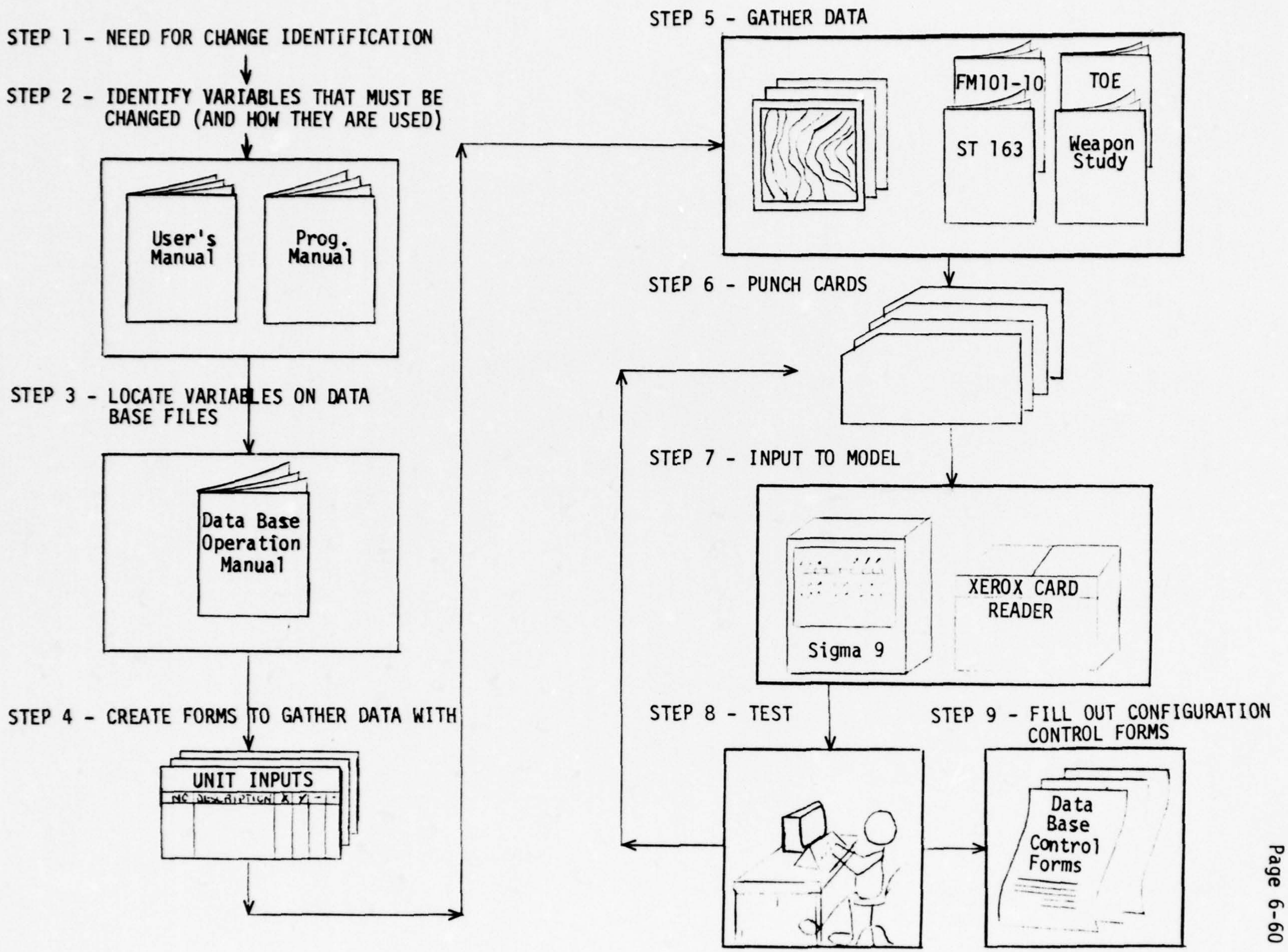

Figure 6-1. Steps Used in Examples of Changing CATTS Simulation.

through these sources and knowing what type of change is desired should yield at least a beginning list of variables. The data base is organized into input decks which are grouped in a logical manner. Once the input deck which contains some related variables is located, all other variables in the deck should be examined for their relevancy and the variables in the related decks under an underlined heading (shown in Table 6-1) should also be examined by looking up definitions in Appendix A. The submodules that perform the operations can be found by examining the table of contents of Section 5 or by using the subroutine names associated with the definitions in Sections 3 and 4 and Table 5-1 (Math Model Subroutine Index) to locate the section where the submodule is discussed. In addition, Section 5 of the Programming Report contains a list of variables input and output by each submodule. Using these sources, the user can locate all the variables required for a change (with the possible exception of some indices - see step 3 below). By reading the definitions in Appendix A and the appropriate parts of Section 5, the user should be able to understand the variables and how they are used.

Step 3: Locate the variables on the data base file.

Table 3-1 in the Data Base/Operations Manual shows the location of all the input variables on the data base file (Example NBIG, NGOLD - see Table 1-1 in Data Base/Operations Manual for the complete list of CATTS data files). The user must always check the 3 miscellaneous data files listed at the end of Table 6-1 in the User's Manual for variables related to the current change because this is where many of the indices are set. Also, most of the variables which control the debug printout are set in the NAMELIST deck, and these can be quite useful while making a change. The value of a variable set in the NAMELIST deck will override the value put in for it in any of the decks which precede this NAMELIST deck.

This process of locating the variables also allows the user to examine the current values input for the variables he is interested in. These current values can often be the best guide as to what data is needed.

Since the decks on the input file contain variables which are logically grouped, once the user has found the appropriate deck and checked the 3 miscellaneous deck, the complete list of variables needed for a change will have been compiled. The only problem with this logic is that some changes cause other changes (for example, it does no good to add a new equipment to the data base unless the unit data is changed to reflect the new TOE).

Step 4: Create forms to gather data with.

If only a small change is to be made, this step may be omitted. For any change that requires any volume of data at all, this step is very important. Use the forms supplied with the CATTS System or make new ones, whichever seems best. (The complete set of forms TRW used to gather the data to create the CATTS data base has been supplied to Ft. Leavenworth personnel). Figures 6-2 and 6-3 are samples of these forms; one for unit data (Figure 6-2) and the other for equipment data (Figure 6-3).

Step 5: Gather data.

Resourcefulness is what is required in finding the data and in inventing the data that cannot be found. Appendix C of the Data Base/Operations Manual and Section 5.7.1 of this manual shows the sources of the original CATTS data base. One source now available to the user that is not shown in Appendix C of the Data Base/Operations Manual is the current CATTS data base. If the user is unsure of how data is used or what the numbers should be, check the current numbers since they are what makes the model operate the way it does now.

Steps 6 & 7: Punch cards and input to model.

Section 4 of the Data Base/Operations Manual covers the exact procedures for editing the data base and initializing the model so that the new data can be read in.

Step 8: Test.

Run test scenarios and see if the desired change was accomplished. Use the graphics, special status reports, and the 15-minute status to check the change. Visually examine a printout of the data base to

BLUE UNIT # ________ UNIT NAME ________ TOE ________

EQUIP #	26	27	28	29	30	31	32	33/34	35/36	37	38	39	40					CO/OFF	NCO/EM
EQUIPMENT NAME	M-16	M-60 LMG	M-2 .50 CAL	DRAGON	TOW	M-60 TANK	M-113	81/107 MORT	155HOW/ 203HOW	CHAP	VULCAN	RED-EYE	TRUCK						
T																			
O																			
E																			
TOTAL																			
+																			
TOTAL +																			
-																			
TOTAL -																			
TOTAL																			
AMMO BL/TOTAL																			

Figure 6-2. TRW Form Used to Gather CATTS Unit Data

EQUIPMENT INPUTS

ITITLE		IEQCOD	UBE	OPE	PCPEC	IMAXRE		NPTE		TARGETS		NSTE	
Equipment Type	Description	Category	Weight	Crew	Pers Cas Eq. Loss	Max. Range Pri.	Max. Range Sec.	Primary (1)	Primary (2)	Primary (3)	Secondary (1)	Secondary (2)	Secondary (3)
1	AK-47	1	1.	1.	0.	400	400	-1	0	0	0	0	0
2	7.62 MM LMG	1	4.	2.	0.	800	800	-1	0	0	0	0	0
3	7.62 MM HMG	1	6.	2.	0.	1000	1000	[illegible]	0	0	0	0	0
4	82 MM AT LCHR	1	10.	2.	0.	275	275	31	30	29	32	40	0
5	57 MM ATAP	1	23.	4.	0.	940	940	[illegible]	30	29	32	40	0
6	82 MM R/G	1	15.	4.	0.	420	420	31	30	32	40	0	0
7	85 MM ATAP	1	28.	2.	0.	1500	16500	31	30	29	32	40	0
8	100 MM AT GUN	1	30.	4.	2.	1500	22000	31	30	29	32	40	0
9	RIPSNORTER	1	50.	2.	0.	2500	2500	31	30	29	32	40	0
10	T-62/115 MM	1	33.	5.	3.	2000	20000	31	30	29	32	40	0
11	BTR-50/14.5 MM	1	10.	1.	3.	1250	1250	-1	0	0	32	30	29
12	82 MM MORT	2	12.	5.	0.	3240	3240	-1	0	0	33	29	34
13	120 MM MORT	3	20.	6.	0.	6000	6000	-1	0	0	34	33	29
14	160 MM MORT	3	25.	6.	0.	9070	9070	-1	0	0	33	34	35
15	140 MM MRL	3	28.	4.	0.	10000	10000	-1	0	0	33	34	29
16	122 MM HOW	3	20.	8.	0.	12800	12800	-1	0	0	35	34	33
17	152 MM GUN/HOW	3	40.	9.	0.	18800	18800	-1	0	0	35	34	33
18	14.5 MM DUAL	1	20.	4.	0.	1500	1500	0	0	0	0	0	0
19	14.5 MM QUAD	1	30.	4.	0.	1500	1500	0	0	0	0	0	0
20	57 MM DUAL	1	32.	4.	0.	1000	1000	0	0	0	0	0	0
21	TRUCK	0	5.	1.	5.	0	0	0	0	0	0	0	0
22	RESERVED	0	0.	0.	0.	0	0	0	0	0	0	0	0
23	RESERVED	0	0.	0.	0.	0	0	0	0	0	0	0	0
*24	RESERVED	0	0.	0.	0.	0	0	0	0	0	0	0	0
25	RESERVED	0	0.	0.	0.	0	0	0	0	0	0	0	0

Figure 6-3. TRW Form Used to Gather CATTS Equipment Data

insure that the proper data was changed. Make a test by inputting the proper event notices in the namelist portion of the run deck (this makes a test exactly repeatable). Run the compare program shown in Section 5.0 of the Data Base/Operations Manual. Repunch cards and input to the model and retest when errors are found.

Step 9: Fill out configuration control forms.

Once the final data for the change has been arrived at through testing, changing, and retesting, fill out the data base configuration control forms. (See Software Configuration Management Plan, 7 March 1975.) It is imperative that the user maintain configuration control.

6.2.2 Specific Examples

Examples of applications of the procedure described in Section 6.2.1 to effect changes in the CATTS simulation via changes in the data base are presented in this section. These examples include:

- How to input the data that defines a unit.
- How to implement a new unit type.
- How to implement a new equipment type.
- How to change the weapon effects data.
- How to change the modes of equipment operation.

These examples will lead to discussions of all the data with the exception of the terrain, vegetation, and soil files, and the most trivial of data on the scenario data file (e.g., NBIG).

6.2.2.1 How to Input the Data that Defines a Unit

Once the need for a new unit has been identified, the search begins for the variables. On Table 6-1 of this User's Manual, the first 2 decks

a type already in the data base. Looking further down Table 6-1, other items that should be investigated are: Unit Menu List (23) and Higher and Adjacent Units (24). And last, but not least, the user must always check the miscellaneous decks (27, 28, and 29) as this is where indices are set, debug printout is controlled (useful when making a change), and miscellaneous variables (some of which could be included in the various decks) are located. This would yield a list of all the variables that might need to be changed to incorporate a new unit into the data base.

Another aid would be to look up the definition of "unit" in Section 3.148 of the <u>User's Manual</u>. Located here are almost all the variables directly associated with units, the exception being some of the indices in the miscellaneous data decks.

The user can also use the SORT and LIST programs described in Appendix A of the <u>User's Manual</u>. The index IU selected from Table 6-27 is used to search the input deck discussed in Appendix A. Table 6-28 shows the variables which are printed out as a result of this search. This table includes all of the variables (with 5 exceptions) which could have been found using any of the three methods suggested. The other five variables are ones which might have to change, and were located by searching the 3 miscellaneous data decks. The user should become familiar with the data in these 3 miscellaneous decks after a few changes in the data base. The five variables are:

NFDU	Number of first dummy unit. (Dummy units include air units used to index air unit arrays). Air unit index for unit I is I + 1 - NFDU.
NLDU	Number of last dummy unit. (Dummy units include air units.) NLDU minus NFDU must be less than 10.
NRUP1	Number of first blue unit (>NLDU).
NUNIT	Total number of units (red and blue). Must be =< 99.
NRU	Number of red units must precede blue units.

Some logic must also be used for other items that might change because of a new unit. For example, if several units are added, this may effect tasking organization, and the variables in decks 11 and 12 should be checked to see if there need to be changes. One might suspect

Table 6-27. Indices of Input Variables
(Only input indices are shown)

Index	Description
IAMMO	ammo type (1-80)
IBD	fire support band number (1-4)
IBDS	fire support target band set (1-9)
IBR	bridge number (1-16)
IBRT	bridge type (1-2)
ICM	control measure (1-100)
ICMT	control measure class (1-6)
ICOEF	weapon effects coefficient set (1-315)
IDF	arty dispersion function (1-10)
IEQ	equipment type (1-80)
IGS	sensor index (1-14)
IGSR	radar type (1-6)
IMODE	equipment mode (1-8)
INMODE	number of entries which can select a mode vector
IOBS	obstacle number (1-50)
IOBST	obstacle type (1-10)
IOPG	op group (1-20)
IPPM	preplanned mission number (1-10)
IPVC	personnel vulnerability class
IRAFT	raft for units (was done for test purposes. Don't use.)
IRD	road number (1-50)
IRDSG	road segment (1-500)
IRDT	road type (1-3)
ISOIL	soil type (1-15)
ITDGB	terrain data grid block (1-64)
IU	unit (1-99)
IUCLS	unit class (1-11)
IUGS	UGS field number (1-10)
IUGST	UGS type (1-10)
IUT	unit type (1-20)
IVEG	vegetation class (1-16)
IVPOL	vegetation polygon (1-225)
IWC	weather class (1-8)

Table 6-28. Variables Indexed on IU

EQINIT (IU,J)	INITIAL AMOUNT OF J-TH EQUIPMENT TYPE IN UNIT IU. (1<=IU<=100,1<=J<=14)	BINIT
FRACTG (IU)	FRACTION OF AREA OF UNIT IU THAT IS FIRED INTO WHEN AREA FIRE IS EMPLOYED AGAINST UNIT IU (1<=IU<=100)	BLEFT2
FRLKOPST(IU)	THE FRACTION OF PEOPLE WHO ARE LOOKOUTS FOR UNIT IU (1<=IU<=100)	NLLOK
INOG (IU)	OPERATIONAL GROUPING TO WHICH UNIT IU BELONGS. (IF 0, UNIT IU DOES NOT BELONG TO ANY OP. GROUP) IF IU IS AN AIR UNIT, INOG = 1 IS A RED AIR UNIT AND INOG = 2 IS A BLUE AIR UNIT. (1<=IU<=100)	BLEFT1
IOPSTU (IU)	OPERATIONAL STATE OF UNIT IU. IF IU IS AN AIR UNIT, IOPSTU = 1 IF IU IS ON A RECONNAISSANCE MISSION AND = 2 IF IU IS ON A STRIKE MISSION. (1<=IU<=100)	BSTAT
ISIZE (IU)	UNIT SIZE OF UNIT IU. A NEGATIVE SIGN PRECEDING SIZE MEANS THE UNIT IS A COMMAND POST (1<=IU<=150) ISIZE=1 SQUAD =2 SECTION =3 PLATOON	DISPLAY

Table 6-28. Variables Indexed on IU (Continued)

		=4 COMPANY/BATTERY/TROOP =5 BATTALION =6 REGIMENT =7 BRIGADE =8 DIVISION =9 CORPS =10 ARMY =11 ARMY GROUP	
ITEQU	(IU,J)	LIST OF (J=1 TO 14) EQUIPMENT TYPES IN UNIT IU, PRINCIPAL TYPE FIRST AND SINK OR CATCH-ALL TYPE LAST. (SUPPORT-FIRE WEAPONS ARE ALWAYS LISTED BEFORE OTHER CATEGORIES.) (1<=IU<=100)	BOBBY
ITPPL	(IU)	UNIT ARM/BRANCH/DUTY. A NEGATIVE SIGN PRECEEDING MEANS UNIT IS AN OBSERVATION POST. (1<=IU<=100) 1 INFANTRY 2 MECH INFANTRY 3 AIRMOBILE INFANTRY 4 AIRBORNE INFANTRY 5 ARMOR 6 CAVALRY 7 ARMORED CAVALRY 8 ANTI-TANK 9 ARTILLERY,TOWED 10 ARTILLERY,SP 11 AIR DEFENSE 12 ENGINEER 13 SIGNAL 14 MAINTENANCE	DISPLAY

Table 6-28. Variables Indexed on IU (Continued)

	15 MEDICAL 16 ORDNANCE 17 QUARTERMASTER	
ITRAV (IU)	TRAVEL CODE OF UNIT IU (1<=IU<=100): 0 - NOT APPLICABLE 1 - UNIT AVOIDS ENGAGEMENT IF POSSIBLE 2 - UNIT NEITHER DESIRES NOR AVOIDS ENGAGEMENT UNTIL DESTINATION IS REACHED 3 - UNIT SEEKS ENGAGEMENT 4 - AIR UNIT	BLEFT1
ITYPEU (IU)	UNIT TYPE FOR UNIT IU (1<=IU<=100)	BSTAT
IUDEF (IU)	DEPTH OF UNIT IU IN METERS. (1<=IU<=100)	BSTAT
IUNIT (IU)	ROUTING CODE FOR ALERTS GENERATED BY UNIT IU (1<=IU<=100) =0 IGNORE (ROUTE TO NONE) 1 ROUTE TO CONTROLLER 1 2 ROUTE TO CONTROLLER 2 3 ROUTE TO CONTROLLER 3 4 ROUTE TO CONTROLLER 1 AND 3 5 ROUTE TO CONTROLLER 2 AND 3 6 ROUTE TO CONTROLLER 1 AND 2 7 ROUTE TO CONTROLLER 1,2 AND 3	ROUTING

Table 6-28. Variables Indexed on IU (Continued)

```
IUWID    (IU)                                                          BSTAT
               WIDTH OF UNIT IU IN METERS.  (1<=IU<=100)

IXY      (IU,J)                                                        BSTAT
               ACTUAL POSITION COORDINATES (J=1 FOR X,J=2
               FOR Y) OF UNIT IU.  (1<=JU<=100)

LISTUN   (IU)                                                          HOWLIST
               A BYTE PACKED ARRAY OF POINTERS USED TO CONTROL THE
               ORDER WHICH UNITS ARE LISTED IN ON ALL THE MENUS AND
               THE STATUS REPORT. EACH WORD CORRESPONDS WITH A UNIT
               IU. THE WORD POINTS TO THE NEXT UNIT IN THE LIST AF-
               TER IU USING THE FOLLOWING METHOD: EACH BYTE OF THE
               WORD CONTAINS THE UNIT NUMBER OF THE NEXT UNIT IN
               THE PROPER SIZE LIST.  (1<=IU<=150)
                    0 BYTE(LEFT MOST)    PLATOON LIST
                    1 BYTE(LEFT MIDDLE) COMPANY LIST
                    2 BYTE(RIGHT MIDDLE)BATTALION AND ABOVE LIST
                    3 BYTE(RIGHT MOST)  LIST OF ALL UNITS

MENIN    (K,IU)                                                        MENI
               A HALFWORD PACKED ARRAY WHICH CONTAINS
               THE INITIAL AMOUNT OF THE FOUR TYPES OF PERSONNEL
               IN EACH UNIT IU (1<=K<=2,1<=IU<=100):
                  LEFT HALFWORD  (1,IU)=NO. OF CO IN UNIT IU
                  RIGHT HALFWORD (1,IU)=NO. OF OFF IN UNIT IU
                  LEFT HALFWORD  (2,IU)=NO. OF EMLDR IN UNIT IU
                  RIGHT HALFWORD (2,IU)=NO. OF EM IN UNIT IU

MENNOW   (K,IU)                                                        MENOW
               A HALFWORD PACKED ARRAY WHICH CONTAINS
               THE CURRENT AMOUNT OF THE FOUR TYPES OF PERSONNEL
               IN EACH UNIT IU (1<=K<=2,1<=IU<=100):
```

Table 6-28. Variables Indexed on IU (Continued)

```
                    LEFT HALFWORD  (1,IU)=NO. OF CO IN UNIT IU
                    RIGHT HALFWORD (1,IU)=NO. OF OFF IN UNIT IU
                    LEFT HALFWORD  (2,IU)=NO. OF EMLDR IN UNIT IU
                    RIGHT HALFWORD (2,IU)=NO. OF EM IN UNIT IU

MSIZE    (IU)                                                    TARGETS
                SIZE OF UNIT IU (LIKE ISIZE WAS INTENDED TO BE).
                SHOULD REFLECT THE ACTUAL NUMBER OF PERSONNEL
                IN THE UNIT.   (1<=IU<=100)
                 1 = SQUAD
                 2 = SECTION
                 3 = PLATOON
                 4 = COMPANY/BATTERY/TROOP
                 5 = BATTALION
                 6 = REGIMENT
                 7 = BRIGADE
                 8 = DIVISION

MVDT1    (IU)                                                    BLEFT2
                MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVDT2    (IU)                                                    BLEFT2
                MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVDT3    (IU)                                                    BLEFT2
                MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVTCD    (IU)                                                    BLEFT2
                MOVEMENT CODE OF UNIT IU (1<=IU<=100):
                1-NORMALLY ENGAGED
                2-WITHDRAWING
                3-DEPLOYING(NOT IN POSITION)
```

Table 6-28. Variables Indexed on IU (Continued)

		4-DEPLOYED(IN POSITION WAITING FOR OTHER UNITS)	
		5-MOVING IN FIXED DIRECTION	
		6-MOVING ALONG ROUTE	
		7-HALTED	
		8-MOVING TOWARD FIXED POINT	
		9-MOVING TOWARD POINT RELATIVE TO FRIENDLY OPERATIONAL GROUPING	
		10-MOVING TOWARD POINT RELATIVE TO ENEMY OPERATIONAL GROUPING	
		11-MOVING TOWARD POINT RELATIVE TO FRIENDLY ENGAGEMENT FEBA	
		12-MOVING TOWARD POINT RELATIVE TO ENEMY ENGAGEMENT FEBA	
		13-MOVING TOWARD POINT RELATIVE TO FRIENDLY UNIT	
		14-MOVING TOWARD POINT RELATIVE TO ENEMY UNIT	
		15-DEPLOYING WHILE NOT ENGAGED(NOT IN POSITION)	
		16-DEPLOYED WHILE NOT ENGAGED (IN POSITION WAITING FOR OTHER UNITS).	
NAMOU	(IU)	NUMBER OF AMMUNITION TYPES IN UNIT IU (1<=IU<=100)	BCBBY
NETAMU	(IU,J)	CURRENT AMOUNT IN TENTHS OF A ROUND, OF J-TH AMMO TYPE CARRIED BY UNIT IU. ACTUAL AMMO TYPE GIVEN BY NTAMU(IU,J). (1<=IU<=100,1<=J<=14)	BCBBY
NETU	(IU)	NUMBER OF EQUIPMENT TYPES IN UNIT IU (1<=IU<=100)	BCBBY
NTAMU	(IU,J)	AMMUNITION TYPE NUMBER OF J-TH AMMO TYPE CARRIED BY UNIT IU. (1<=IU<=100,1<=J<=14)	BCBBY

Table 6-28. Variables Indexed on IU (Continued)

Variable	Index	Description	Common
NXHGCM	(IU)	THE UNIT NUMBER OF THE UNIT WHICH IS NEXT HIGHER COMMAND FOR UNIT IU(IU=1,150)	NEXTCOMM
OBSDEL	(IU)	OBSTACLE DELAY COUNTER FOR UNIT IU (1<=IU<=100)	BLEFT2
FDIR	(IU,J)	DIRECTION FACED BY UNIT IU - STORES AS SIN(J=1), COS(J=2). CARTESIAN COORDINATE SYSTEM USED. (1<=IU<=100)	BSTAT
TOTEQL	(IU,J)	TOTAL NUMBER OF PIECES REMAINING OF J-TH EQUIPMENT TYPE CARRIED BY UNIT IU. (1<=IU<=100,1<=J<=14)	BCBBY
UNNAME	(I,IU)	12 CHARACTER NAME ASSOCIATED WITH EACH OF IU(1-150) UNITS (1<=I<=3)	NAMES

that units might be specifically mentioned in the decks under the UNIT OPERATIONS DATA heading. Though currently (with the possible exception of the preplanned mission deck) no units are specifically mentioned, they can be in decks 6, 7, 8, and 9.

Since units are used in some way by each CATTS module, the user can't really pick out one subsection of Section 5 to read to tell how the variables are used. However, there are many related terms in Sections 3 and 4 of the User's Manual. Listed below are some that the user could pick by looking at the table of contents for Section 3:

Section	3.10	Air Unit
"	3.18	Basic Load
"	3.19	Battalion
"	3.30	Color
"	3.31	Combat Unit
"	3.32	Combat Support Unit
"	3.33	Combat Service Support Unit
"	3.35	Command Post
"	3.36	Company
"	3.42	Current Load
"	3.56	Fake Unit
"	3.89	Movement Code (Unit)
"	3.92	Next Higher Command
"	3.104	Personnel
"	3.106	Platoon
"	3.145	Travel Code
"	3.148	Unit
"	3.149	Unit Class
"	3.150	Unit Location
"	3.151	Unit Size
"	3.152	Unit Status
"	3.153	Unit Type

If the user wishes to follow a particular variable to determine its use, he should look up the variable in the Super Index. This lists all the subroutines where the variable is used. Then Table 5-1 in the User's Manual will show where these subroutine operations are discussed in the User's Manual and Table 5-1 in the Programming Report shows where each subroutine is discussed in the Programming Report.

Once all the variables have been identified and a basic understanding of what they do is reached, it is a very straightforward matter to complete the ramining step using the instructions and the manuals referenced in the general examples.

6.2.2.2 How to Implement a New Unit Type

Once the need is identified, we see from Table 6-1 that most of the variables needed for a new unit type are in the unit type deck described on page 52 of the Data Base/Operations Manual. The definition of "unit type" in Section 3.153 of the User's Manual yields the complete list, with the exception of the miscellaneous deck variables. The SORT and LIST programs described in Appendix A of the User's Manual are run using the index IUT selected from Table 6-27 to yield the list of variables shown in Table 6-29.

Using the Data Base/Operations Manual, all of the variables except five (5) are discovered to be in the UNIT TYPE deck. These five are:

ADTPR — Fraction of unit type IUNTYPE, red (ICOLOR = 1) or blue (ICOLOR = 2), can be expected to be acquired at any given time due to aerial surveillance; (K = 1) target unit in engagement region, (K = 2) target unit outside engagement region. (1<=IUNTYP<=20)

DISMAX — The maximum distance (in meters) for the line of sight calculations for unit type IUT. (1<=JUT<=20)

HUN — Height (in meters) of a single element of a unit of unit type I - for line of sight calculations. (1<=IUT<=20)

IAIRVUL — An indicator describing the vulnerability of unit type IUT to air ordnance. (1<=IUT<=20)

0 = not used
1 = not armored
2 = light armored
3 = heavily armored

WUN — Width (in meters) of a single element of a unit of type IUT for line of sight calculations. (1<=IUT<=20)

Since the definition for ADTPR talks about target acquisition, the TARGET ACQUISITION deck is checked in the Data Base/Operations Manual, and this reveals not only that ADTPR is read in via this deck, but that the value is not used by CATTS. Makes data collection very easy for ADTPR. The only places left to look for the others are the 3 miscellaneous

Table 6-29. Variables Indexed on IUT

ACIFR	(IUT,ICOLOR,K)	FRACTION OF UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE (ICOLOR=2), CAN BE EXPECTED TO BE ACQUIRED AT ANY GIVEN TIME DUE TO AERIAL SURVEILLANCE; (K=1) TARGET UNIT IN ENGAGEMENT REGION, (K=2) TARGET UNIT OUTSIDE ENGAGEMENT REGION. (1<=IUT<=20)	C
DISMAX	(IUT)	THE MAXIUM DISTANCE (IN METERS) FOR THE LINE OF SIGHT CALCULATION FOR UNIT TYPE IUT. (1<=JUT<=20)	DISMX
HU	(IUT)	THE EFFECTIVE HEIGHT (IN METERS) FOR THE TYPE IUT UNIT FOR VISUAL DETECTION (1<=IUT<=11)	VISUSER
HUN	(IUT)	HEIGHT IN METERS OF A SINGLE ELEMENT OF A UNIT OF UNIT TYPE I - FOR LINE OF SIGHT CALCULATIONS (1<=IUT<=20)	UNWDHD
IAIRVUL	(IUT)	AN INDICATOR DESCRIBING THE VULNERABILITY OF UNIT TYPE IUT TO AIR ORDNANCE (1<=IUT<=20) 0=NOT USED 1=NOT ARMORED 2=LIGHT ARMORED 3=HEAVILY ARMORED	VULN2AIR
IDPRC	(IUT,ICOLOR)	FOR EACH UNIT TYPE IUT ,RED(ICOLOR=1),OR BLUE(ICOLOR =2), CODE THAT INDICATES WHICH RANGE TO USE WITH TARGET-ACQUISITION PROBABILITY CURVE TO DETERMINE ACQUISITION OF TARGETS FOR INDIRECT-FIRE WEAPONS IN UNIT (1<=IUT<=20)	C

Table 6-29. Variables Indexed on IUT (Continued)

Variable	Indices	Description	
		0-IMPLIES DISTANCE FROM FIRING UNIT TO TARGET UNIT 1-IMPLIES DISTANCE FROM LOCAL FRIENDLY FEBA TO TARGET UNIT.	
IPRNO	(IUT,K)	BYTE-PACKED ARRAY GIVING 40 EQUIPMENT MANNING PRIORITIES FOR UNIT TYPE IUT. NUMBERS OF COR-RESPONDING EQUIPMENT TYPES GIVEN BY ARRAY INPUT. (1<=IUT<=20,1<=K<=10)	C
IPWT	(IUT,J)	FOR GIVEN UNIT TYPE IUT, A BYTE PACKED LIST OF EQUIPMENT TYPE NUMBERS. THEIR ASSOCIATED MANNING PRIORITIES ARE GIVEN BY CORRESPONDING BYTES OF IPRNO. (1<=IUT<=20,1<=J<=10)	C
ITAP	(IUT,ICOLOR)	NUMBER OF THE TARGET-ACQUISITION PROBABILITY CURVE TO USE FOR DETECTION OF UNITS BY A GROUND-BASED SURVEILLANCE SYSTEM. FOR IUT = TYPE OF UNIT TO BE DETECTED;ICOLOR = 1 IF UNIT IS RED, =2 IF UNIT IS BLUE. IF ITAP =0, DETECTION PROBABILITY =1.0 (1<=IUT<=20)	C
ITYPDW	(IUT,ICOLOR)	MAXIMUM DISTANCE (IN METERS) BEYOND END OF ENEMY FEBA IN AN ESTABLISHED ENGAGEMENT THAT AN UNENGAGED RED (ICOLOR=1) OR BLUE(ICOLOR=2) UNIT (OR ITS OPER-ATIONAL GROUPING) OF A GIVEN TYPE IUT WILL BE ALLOW-ED TO JOIN EXISTING ENGAGEMENT (RATHER THAN FORM A NEW ONE). THIS DISTANCE APPLIES ONLY TO ENCOUNTERS BETWEEN UNITS, AND DISTANCE MAY BE NEGATIVE. (1<=IUT<=20)	C

Table 6-29. Variables Indexed on IUT (Continued)

KEQMOV	(IUT,ICOLOR)	C
	FOR EACH UNIT TYPE IUT,RED(ICOLOR=1) OR BLUE(ICOLOR=2), A CODE INDICATING WHICH TYPES OF EQUIPMENT DETERMINE RATE OF MOVEMENT FOR THE UNIT (1<=IUT<=20): 0 - ALL EQUIPMENT 1 - DIRECT-FIRE WEAPONS ONLY 2 - DIRECT-AND INDIRECT-FIRE WEAPONS ONLY 3 - SUPPORT-FIRE WEAPONS ONLY 4 - NONWEAPONS ONLY.	
MAXID	(IUT,ICOLOR)	C
	FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE (ICOLOR=2), MAXIMUM DISTANCE (IN METERS) FORWARD OF FRIENDLY FEBA THAT ITS INDIRECT FIRE WEAPONS WILL FIRE AGAINST TARGETS IN SAME ENGAGEMENT, WHEN TARGET UNITS ARE NOT ELIBIBLE TO RECEIVE DIRECT FIRE. THIS DISTANCE IS A CONSTRAINT ONLY FOR WEAPON UNITS AGAINST TARGET UNITS IN SAME ENGAGEMENT. (1<=IUT<=20)	
MFIGHT	(IUT,ICOLOR)	C
	FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE (ICOLOR=2), RANGE (IN METERS) AT WHICH A UNIT MUST INITIATE AN ENGAGEMENT WITH AN ENEMY UNIT. (1<=IUT<=20)	
NGARNG	(IUT,ICOLOR)	C
	FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE (ICOLOR=2), RANGE AT WHICH A UNIT IS ELIGIBLE TO INITIATE AN ENGAGEMENT WITH AN ENEMY UNIT. (1<=IUT<=20)	

Table 6-29. Variables Indexed on IUT (Continued)

POSFAC	(IUT,ICOLOR,IFTYP)	IF A TARGET UNIT OF TYPE IUT AND COLOR ICOLOR (1 =RED,2 =BLUE) IS IN SPECIAL-THREAT CATEGORY, AND A WEAPON IN CATEGORY IFTYP (=KFICTR) IS TO BE ALLOCATED, THEN ITS TARGET WEIGHT IS MULTIPLIED BY POSFAC (IUT,ICOLOR,IFTYP). (1<=IUT<=20,1<=IFTYPE<=3)	
RTGT	(IUT)	THE REFLECTANCE FOR THE TYPE IUT UNIT (1<=IUT<=11)	VISUSER
TYPFAC	(IUT,ICOLOR)	WEIGHTING FACTOR FOR UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE(ICOLOR=2), THAT EXPRESSES IMPORTANCE OF UNIT AS A SUPPORT FIRE TARGET. (1<=IUT<=20)	C
WU	(IUT)	THE EFFECTIVE WIDTH (IN METERS) FOR THE TYPE IUT UNIT FOR VISUAL DETECTION (1<=IUT<=11)	VISUSER
WUN	(IUT)	WIDTH IN METERS OF A SINGLE ELEMENT OF A UNIT OF TYPE IUT FOR LINE OF SIGHT CALCULATIONS (1<=IUT<=20)	UNWDHD

decks shown on Table 6-1. DISMAX and IAIRVUL are discovered to be in the namelist portion of the data file. Two variables are discovered in the miscellaneous variable deck at the front of the data file which might need to be changed when adding a unit type. These are NPRWT, the maximum number of priority weapon types allowed for a particular unit type, and NUNTYP, the total number of unit types. No other variables of interest for unit type are discovered by searching the namelist portion of the data base file. However, neither HUN nor WUN appears in any of the places searched so far. A check of Appendix A of the Data Base/Operations Manual shows that the variables are both eligible to be input via the namelist portion of the data base. Checking Super Index, the variables are shown in CMAIN and LOSCOMP. Checking CMAIN, the variables are shown to be set via a data statement on line 66. Thus, the logical way to set these variables is via the namelist with the data statement as a backup default value.

Looking up any variable in Super Index yields all the names of the Subroutines where the variable is used. These subroutines and the sections which discuss their functioning can then be looked up using Table 5-1 in this manual and Table 5-1 in the Programming Report. Once these sections are read, and a basic understanding of each variable is reached, the only difficult part remaining is gathering the data. Inputting the data is explained in the Data Base/Operations Manual, and the configuration control is covered by the Software Configuration Management Plan of 7 March 1975, as shown in the general steps at the beginning of this section.

6.2.2.3 How to Implement a New Equipment Type

Table 6-1 of this User's Manual shows the equipment data deck to be discussed on page 17 of the Data Base/Operations Manual. Also shown as equipment data is the weapon effects deck. This data must indeed be added if the new equipment is a weapon, but will be covered in the next example. Further examination of Table 6-1 indicates that if the new equipment is a sensor, the appropriate decks under the TARGET ACQUISITION DATA heading should be examined for relevant variables. Also, it is logical that adding a new equipment will do little good if the Unit Data is not changed so that the proper units and unit types have the equipment, so the variables in these two decks should be checked for relevancy (it turns out that

equipment manning is controlled in the UNIT TYPE deck). Also, if the new equipment is a weapon, obviously the variables in the Ammunition Name Deck should be checked.

The Equipment type discussion in Section 3.54 and the SORT/LIST programs described in Appendix A give a complete list of the important equipment variables. This list is shown as Table 6-30 which is a sort on index IEQ (from Table 6-27).

Tables 6-31 and 6-32 are the result of a SORT/LIST on two sensor related indices selected from Table 6-27. These variables should obviously be looked at if the new equipment is a sensor.

The variables listed in Table 6-30 all appear in the EQUIPMENT INPUT Deck or in the namelist portion of the data base file with the exception of IECTH. Since it is nowhere to be found, Super Index is consulted, and it shows IECTH to be used in FORMAIM and FIRAGEN. Upon checking, IECTH is discovered to be set by a data statement in line 136 of Subroutine FORMAIN. Appendix A of the <u>Data Base/Operations Manual</u> shows that the variable IECTH can be input via the namelist portion of the data base file, which is what should be done if a change is desired. The data statement in FORMAIN can then serve as a default value. As recommended, one final check of the namelist portion and the other 2 miscellaneous decks reveals 4 other variables that might need change as the result of a new equipment. These are:

NEQUIP	total # of equipment types.
NMODES	maximum number of modes of operation assigned for any equipment class.
IPDFNA	degradation used for manning priority of a vehicle.
IPDSFW	degradation used for manning a support fire weapon.

All these variables allow any type of ground equipment or air equipment to be added (both the ground and air definition is included with each variable). Shown in Table 6-33 are all the variables with only their air equipment definitions.

Table 6-30. Variables Indexed on IEQ

Variable	Description	Common Block
DBEQU (IEQ,J)	NOISE LEVEL (IN DB) PRODUCED BY IEQ-TH EQUIPMENT TYPE (1<=IEQ<=80): J=1 WHEN UNIT IS NOT MOVING. J=2 WHEN UNIT IS MOVING.	AURALIN
DIES4KM (IEQ)	AMOUNT OF DIESEL FUEL IN GALLONS THAT EQUIPMENT TYPE IEQ USES TO TRAVEL ONE KM (1<=IEQ<=80)	EQFUEL
DTMTBFI (IEQ)	THE NEGATIVE INVERSE OF THE MEAN TIME BETWEEN FAILURE IN MINUTES FOR GROUND EQUIPMENT TYPE IEQ (1<=IEQ<=80)	MAINTATR
EQCAPAC (IEQ)	FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ) >= 0), FUEL CAPACITY IN GALLONS OF EQUIPMENT TYPE N, INCLUDING SPARE CANS CARRIED. FOR AIRCRAFT (IEQCOD(IEQ) = -1), FUEL CAPACITY OF AIRCRAFT (POUNDS) (1<=IEQ<=80)	EQFUEL
EQNAME (J,IEQ)	12 CHARACTER NAME ASSOCIATED WITH EQUIPMENT TYPE IEQ (1-80) J=1 FIRST FOUR CHARACTERS OF EQUIPMENT NAME J=2 SECOND FOUR CHARACTERS OF EQUIPMENT NAME J=3 THIRD FOUR CHARACTERS OF EQUIPMENT NAME	NAMES
EQOVRD (IEQ)	THE MAXIMUM DIAMETER IN METERS TREE TRUNKS IN A GIVEN VEGETATION CLASS THAT THE IEQ-TH (1<=IEQ<=80) EQUIPMENT TYPE CAN OVERRIDE	EQUIP

Table 6-30. Variables Indexed on IEQ (Continued)

EQWDTH (IEQ)	THE WIDTH IN METERS OF THE IEQ-TH (1<=IEQ<=80) EQUIPMENT TYPE.	EQUIP
GAS4KM (IEQ)	AMOUNT OF GAS IN GALLONS THAT EQUIPMENT TYPE IEQ USE TO TRAVEL ONE KM (1<=IEQ<=80)	EQFUEL
IAMTE (IEQ,IMODE)	(1<=IEQ<=80,1<=IMODE<=8) FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ) >= 0), AMMUNITION TYPE USED BY WEAPON TYPE IEQ IN MODE OF OPERATION IMODE (0 IMPLIES NO AMMUNITION USED). FOR AIRCRAFT (IEQCOD(IAC) = -1), IMODE = 1 TAKEOFF DELAY TIME FOR THIS AIRCRAFT (MIN. 2 LANDING DELAY TIME FOR THIS AIRCRAFT (MIN. FOR AIR ORDNANCE (IEQCOD(IAC) = -2), IMODE = 1 NUMBER OF AMMUNITION TYPE FOR THIS EQUIP-MENT, IF ANY 2 NUMBER OF ROUNDS IN A STANDARD LOAD OF THA AMMUNITION TYPE 3 RATE OF FIRE OF THIS EQUIPMENT (ROUNDS/MIN 4 NUMBER OF DROPS PER PASS (APPLIES TO BOMBS 5 DISTANCE BETWEEN DROPS (METERS) 6 DUD PROBABILITY TIMES 100 7 KILL PROBABILITY TIMES 100 FOR BRIDGE TYPE 8 KILL PROBABILITY TIMES 100 FOR BRIDGE TYPE	A2
IECTH (IEQ)	NUMBER OF PIECES OF EQUIPMENT TYPE IEQ (1<=IEQ<=80) WHICH MAY BE LOST BY A UNIT BEFORE A CASUALTY ALERT IS GENERATED	FIRATE

Table 6-30. Variables Indexed on IEQ (Continued)

```
IEQCLS   (IEQ)                                                    A3
            (1<=IEQ<=80)
            FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
            >= 0), FOR EACH GROUND EQUIPMENT TYPE IEQ, A GENERAL
            CLASSIFICATION FOR AIR ORDNANCE, DEFINED AS FOLLOWS:
                    1=SMALL ARMS
                    2=LIGHT MORTARS
                    3=ARTILLERY
                    4=NON-ARMORED VEHICLES
                    5=ARMORED VEHICLES
            FOR AIR ORDNANCE (IEQCOD(IEQ) = -2),
            IEQCLS = 1 IEQ IS A 250-LB LOW-DRAG BOMB
                     2 IEQ IS A 500-LB LOW-DRAG BOMB
                     3 IEQ IS A 750-LB LOW-DRAG BOMB
                     4 IEQ IS A 1000-LB LOW-DRAG BOMB
                     5 IEQ IS A 2000-LB LOW-DRAG BOMB
                     6 IEQ IS A 250-LB HIGH-DRAG BOMB
                     7 IEQ IS A 500-LB HIGH-DRAG BOMB
                     8 IEQ IS A 750-LB HIGH DRAG BOMB
                     9 IEQ IS MAVERICK
                    10 IEQ IS SHRIKE
                    11 IEQ IS 2.75 ROCKETS
                    12 IEQ IS 20-MM CANNON
                    13 IEQ IS CBU-2
                    14 IEQ IS CBU-24
                    15 IEQ IS ROCKEYE
                    16 IEQ IS NAPALM
            NOT USED FOR AIRCRAFT.

IEQCOD   (IEQ)                                                    A1
            EQUIPMENT CATEGORY CODE OF GIVEN EQUIPMENT
            TYPE IEQ (1<=IEQ<=80):
```

Table 6-30. Variables Indexed on IEQ (Continued)

	-3-AIR SENSOR -2-AIR WEAPON -1-AIRCRAFT 0-NOT A WEAPON 1-DIRECT FIRE WEAPON 2-INDIRECT FIRE WEAPON 3-SUPPORT FIRE WEAPON. 4-AIR DEFENSE WEAPON	
IEQSIDE (IEQ)	A BYTE PACKED ARRAY (IEQ=1,20) WHERE EACH BYTE I CONTAINS A CODE CONTROLLING WHETHER EQUIPMENT TYPE I WILL APPEAR ON THE MENUS WHEN THE RED OR BLUE C AND C BUTTON IS PUSHED. 0= BOTH ON RED AND BLUE 1= RED ONLY 2= BLUE ONLY 3= NEITHER RED OR BLUE (SPARE)	EQSIDE
IMAXRE (IEQ,ITGTE)	(1<=IEQ<=60) FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ) >= 0), MAXIMUM FIRING RANGE (IN METERS) OF EACH WEAPON TYPE IEQ AGAINST PRIMARY (ITGTE=1), SECONDARY (ITGTE=2) TARGET ELEMENTS FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD (IEQ) = -2 OR -3), MAXIMUM RANGE AT WHICH EQUIP-MENT MAY BE USED (ITGTE = 1)	A1
IMINRE (IEQ)	(1<=IEQ<=60) FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ) >= 0), MINIMUM FIRING RANGE (IN METERS) FOR WEAPON	MINRANGE

Table 6-30. Variables Indexed on IEQ (Continued)

		(EQUIPMENT) TYPE IEQ FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD (IEQ) = -2 OR -3), MINIMUM RANGE AT WHICH EQUIPMENT MAY BE USED	
IPVCE	(IEQ,IMODE)	FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ) >= 0), PERSONNEL VULNERABILITY CLASS ASSOCIATED WITH EACH MODE IMODE OF EQUIPMENT TYPE IEQ. FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD (IEQ) = -2 OR -3), EQUIPMENT NUMBER OF THE IMODE-TH ALLOWABLE AIRCRAFT TYPE ON WHICH IEQ MAY BE USED. (HENCE, A MAXIMUM OF EIGHT AIRCRAFT PER EQUIPMENT TYPE.) THE FIRST ZERO ENCOUNTERED IMPLIES NO OTHER ALLOWABLE AIRCRAFT. (1<=IEQ<=80,1<=IMODE<=6)	A2
NPTE	(IEQ,J)	EQUIPMENT NUMBERS OF TWO PRIMARY TARGET TYPES FOR WEAPON IEQ; -1 IMPLIES A PERSONNEL TARGET. (1<=IEQ<=60,1<=J<=3)	A2
NSTE	(IEQ,J)	EQUIPMENT NUMBERS TWO SECONDARY TARGET TYPES FOR WEAPON IEQ; -1 IMPLIES A PERSONNEL TARGET. (1<=IEQ<=80,1<=J<=3)	A2
OPE	(IEQ)	NUMBER OF MEN REQUIRED TO OPERATE EQUIPMENT IEQ IN THREE STATES : DISMOUNTED,MOUNTED,MAXIMUM CAPACITY. THE THREE VALUES ARE PACKED INTO THE FIRST THREE BYTES OF THE WORD RESPECTIVELY. (1<=IEQ<=80)	A2

Table 6-30. Variables Indexed on IEQ (Continued)

```
FCFEC    (IEQ)                                                    A2
                EXPECTED PERSONNEL CASUALTIES PER EQUIPMENT
                CASUALTY FOR EQUIPMENT TYPE IEQ   (1<=IEQ<=NEQ)

PCFE     (IEQ,IMODE)                                              A2
                FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
                >=0), RATE OF FIRE OF WEAPON TYPE IEQ IN EACH MODE
                IMODE (ROUNDS/MINUTE)
                FOR AIRCRAFT (IEQCOD(IEQ) = -1),
                IMODE = 1 FUEL EXPENDITURE FOR LOSING ALTITUDE
                          (LB/METER)
                        2 FUEL EXPENDITURE FOR GAINING ALTITUDE
                          (LB/METER)
                        3 FUEL EXPENDITURE AT MINIMUM SPEED, MINIMUM
                          LOAD, BEST PRESSURE DENSITY (LB/MIN)
                        4 FUEL EXPENDITURE AT CRUISE SPEED (LB/MIN)
                        5 FUEL EXPENDITURE AT MAXIMUM SPEED (LB/MIN)
                        6 RATIO OF FUEL EXPENDITURE RATE AT MAXIMUM
                          LOAD TO FUEL EXPENDITURE RATE AT MINIMUM
                          LOAD
                        7 RATIO OF FUEL EXPENDITURE RATE AT WORST
                          PRESSURE DENSITY TO FUEL EXPENDITURE RATE
                          AT BEST PRESSURE DENSITY
                        8 NOT USED
                FOR AIR ORDNANCE (IEQCOD(IEQ) = -2),
                IMODE = 1 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                          ABILITY CLASS 1 (STANDING) AND WITHIN TAR-
                          GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                        2 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                          ABILITY CLASS 2 (CROUCHING) AND WITHIN TAR
                          GET AREA WHO ARE KILLED BY THIS EQUIPMENT
```

Table 6-30. Variables Indexed on IEQ (Continued)

```
                   3 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                     ABILITY CLASS 3 (PRONE) AND WITHIN TAR-
                     GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                   4 FRACTION OF EQUIPMENT WITH IEQCLS = 1 AND
                     WITHIN TARGET AREA WHICH IS DAMAGED BY
                     THIS EQUIPMENT
                   5 FRACTION OF EQUIPMENT WITH IEQCLS = 2 AND
                     WITHIN TARGET AREA WHICH IS DAMAGED BY
                     THIS EQUIPMENT
                   6 FRACTION OF EQUIPMENT WITH IEQCLS = 3 AND
                     WITHIN TARGET AREA WHICH IS DAMAGED BY
                     THIS EQUIPMENT
                   7 FRACTION OF EQUIPMENT WITH IEQCLS = 4 AND
                     WITHIN TARGET AREA WHICH IS DAMAGED BY
                     THIS EQUIPMENT
                   8 FRACTION OF EQUIPMENT WITH IEQCLS = 5 AND
                     WITHIN TARGET AREA WHICH IS DAMAGED BY
                     THIS EQUIPMENT
              (1<=IEQ<=80,1<=IMODE<=8)

ROME     (IEQ,IMODE)                                              A2
              FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
              >= 0), RATE OF MOVEMENT (IN METERS/MINUTE) OF WEAPON
              TYPE I IN MODE IMODE (UNOBSTRUCTED).
              FOR AIRCRAFT (IEQCOD(IEQ) = -1),
              IMODE = 1 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                     AT BEST MODELED PRESSURE DENSITY (PDBEST)
                    = 2 MAXIMUM ALTITUED OF AIRCRAFT (METERS)
                    = 3 MINIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 4 CRUISE SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 5 MAXIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 6 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                     AT WORST MODELED PRESSURE DENSITY (PDWORST
```

Table 6-30. Variables Indexed on IEQ (Continued)

	THE CORRECT NEGATIVE VALUE WILL INSURE THAT AN AIRCRAFT CANNOT FLY AT PRESSURE DENSITIES BELOW ITS CAPABILITY = 7 POOREST METEOROLOGICAL VISIBILITY IN WHICH AIRCRAFT CAN CONTINUE ITS MISSION (METERS) = 8 NOT USED FOR EQUIPMENT OTHER THAN AIRCRAFT (IEQCOD(IEQ) = -2 OR -3), IMODE = 1 WEIGHT OF EQUIPMENT (POUNDS) INCLUDING STANDARD AMMUNITION LOAD = 2 MINIMUM AIRCRAFT SPEED (METERS/MINUTE) AT WHICH EQUIPMENT CAN BE USED = 3 MAXIMUM SPEED AT WHICH EQUIPMENT CAN BE USED (METERS/MINUTE) = 4 MINIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE USED (METERS) = 5 MAXIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE = 6 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD CRATER RADIUS (METERS) AGAINST ROAD TYPE 1 = 7 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD CRATER RADIUS (METERS) AGAINST ROAD TYPE 2 = 8 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD CRATER RADIUS (METERS) AGAINST ROAD TYPE 3 (1<=IEQ<=80,1<=IMODE<=8)	
ROMMX (IEQ)	THE MAXIMUM RATE OF MOVEMENT (IN METERS/MINUTE) FOR THE IEQ-TH (1<=IEQ<=80) EQUIPMENT UNDER IDEAL CONDITIONS	MAXRCM
SLPEMX (IEQ)	THE MAXIMUM SLOPE THAT THE IEQ-TH (1<=IEQ<=80) EQUIPMENT CAN NEGOTIATE	EQUIP

Table 6-30. Variables Indexed on IEQ (Continued)

UBE	(IEQ)	WEIGHING FACTOR: IMPORTANCE OF EQUIPMENT TYPE IEQ AS A TARGET. (1<=IEQ<=80)	A2
VCI	(IEQ)	VEHICLE CONE INDEX FOR THE IEQ-TH (1<=IEQ<=80) EQUIPMENT	EQUIP

Table 6-31. Variables Indexed on IGS

ISENNT (IGS)			SENSTYPE
THE EQUIPMENT TYPE NUMBER FOR SENSOR TYPE IGS:			
WHERE IGS	=1	BINOC. 6X30	
	=2	BINOC. 7X30	
	=3	NOD TVS-4	
	=4	STARLITE SCOP TVS-2	
	=5	AN/PPS-5	
	=6	AN/MPQ-4A	
	=7	AN/TPS-25A	
	=8	GRIEF	
	=9	GRIM	
	=10	GRIP	
	=11	SLAR	
	=12	KA 30	
	=13	KA 60	
	=14	36 IN. VERTICAL RADAR	

Table 6-32. Variables Indexed on IGSR

Variable	Description	Common
IGRADSEN(IGSR)	INDEX TO EQUIPMENT NUMBER FOR IGSR-TH GROUND SURVEILLANCE RADAR (1<=IGSR<=6)	RADARCOM
PRSCAN (IGSR)	PROBABILITY OF ILLUMINATING A SINGLE TARGET WITH RADAR IGSR IN ONE MODEL TIME STEP (=1/SCAN TIME IN MINUTES) (1<=IGSR<=6)	RADARCOM
RDCA (IGSR)	FIRST COEFFICIENT OF QUADRATIC FIT TO THE PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH RADAR TYPE IGSR (1<=IGSR<=6)	RADARCOM
RDCB (IGSR)	SECOND COEFFICIENT OF QUADRATIC FIT TO THE PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH RADAR TYPE IGSR (1<=IGSR<=6)	RADARCOM
RDCC (IGSR)	THIRD COEFFICIENT OF QUADRATIC FIT TO THE PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH RADAR TYPE IGSR (1<=IGSR<=6)	RADARCOM
RDOTMN (IGSR)	MINIMUM DOPPLER THRESHOLDS FOR RADAR TYPE IGSR (METERS/MINUTES) (1<=IGSR<=6)	RADARCOM
RDOTMX (IGSR)	MAXIMUM DOPPLER THRESHOLDS FOR RADAR TYPE IGSR (METERS/MINUTES) (1<=IGSR<=6)	RADARCOM

Table 6-33. Air Equipment Variables

IEQCOD(IEQ)	=	-1 ⟹ Equipment IEQ is an aircraft
		-2 ⟹ Equipment IEQ is an airborne weapon
		-3 ⟹ Equipment IEQ is an airborne sensor

Assume equipment IAC is an aircraft; i.e., IEQCOD(IAC) = -1.

ROME(IAC,1)	=	Maximum load aircraft can carry (pounds) at best modeled pressure density (PDBEST)
ROME(IAC,2)	=	Maximum altitude of aircraft (meters)
ROME(IAC,3)	=	Minimum speed of aircraft (meters/minute)
ROME(IAC,4)	=	Cruise speed of aircraft (meters/minute)
ROME(IAC,5)	=	Maximum speed of aircraft (meters/minute)
ROME(IAC,6)	=	Maximum load aircraft can carry (pounds) at worst modeled pressure density (PDWORST)

Note: The correct negative value for ROME(IAC,6) will insure that an aircraft cannot fly at pressure densities below its capability.

ROME(IAC,7)	=	Poorest meteorological visibility in which aircraft can continue its mission (meters)
ROME(IAC,8)	=	Maximum acceleration (meters/minute^2)
ROFE(IAC,1)	=	Fuel expenditure for losing altitude (lb/meter of altitude)
ROFE(IAC,2)	=	Same for gaining altitude
ROFE(IAC,3)	=	Fuel expenditure at minimum speed, minimum load, best pressure density (lb/min)
ROFE(IAC,4)	=	Same at cruise speed
ROFE(IAC,5)	=	Same at maximum speed
ROFE(IAC,6)	=	$\frac{\text{Fuel expenditure rate at maximum load}}{\text{Fuel expenditure rate at minimum load}} \left(\begin{matrix}\text{at standard}\\ \text{pressure density}\end{matrix}\right)$
ROFE(IAC,7)	=	$\frac{\text{Fuel expenditure rate at worst pressure density}}{\text{Fuel expenditure rate at best pressure density}}$
ROFE(IAC,8)	=	Climb rate maximum (meters/minute)
IAMTE(IAC,1)	=	Takeoff delay time for this aircraft (minutes)
IAMTE(IAC,2)	=	Landing delay time for this aircraft (minutes)
EQCAPAC(IAC)	=	Fuel capacity of aircraft (pounds)

Table 6-33. Air Equipment Variables (Continued)

Assume equipment IEQ is an air equipment other than an aircraft; i.e., IEQCOD(IEQ) = -2 or -3.
Then

	IPVCE(IEQ,J)	=	Equipment number of the Jth allowable aircraft type on which IEQ may be used. (Hence, a maximum of eight aircraft per equipment type.) The first zero encountered ⟹ no other allowable aircraft
	IMINRE(IEQ)	=	Minimum range at which equipment may be used
	IMAXRE(IEQ,1)	=	Maximum range at which equipment may be used
	ROME(IEQ,1)	=	Weight of eouipment (pounds) including standard ammunition load
	ROME(IEQ,2)	=	Minimum aircraft speed (meters/minute) at which equipment can be used
	ROME(IEQ,3)	=	Maximum speed at which equipment can be used (meters/minute)
	ROME(IEQ,4)	=	Minimum altitude at which equipment can be used (meters)
	ROME(IEQ,5)	=	Maximum altitude at which equipment can be used (meters)
Only filled for IEQCOD(IEQ) = -2	ROME(IEQ,6)	=	Road crater radius for road type 1 (meters)
	ROME(IEQ,7)	=	Road crater radius for road type 2 (meters
	ROME(IEQ,8)	=	Road crater radius for road type 3 (meters)

Assume IEQCOD(IEQ) = -2, that equipment IEQ is an air-delivered weapon.
Then

ROFE(IEQ,1)	=	Fraction of personnel in personnel vulnerability Class 1 (standing) and within target area who are killed by this equipment
ROFE(IEQ,2)	=	Same for personnel vulnerability Class 2 (crouching)
ROFE(IEQ,3)	=	Same for personnel vulnerability Class 3 (prone)
ROFE(IEQ,4)	=	Fraction of equipment with IEQCLS = 1 and within target area which is damaged by this equipment
ROFE(IEQ,5)	=	Same for IEQCLS = 2
ROFE(IEQ,6)	=	Same for IEQCLS = 3
ROFE(IEQ,7)	=	Same for IEQCLS = 4
ROFE(IEQ,8)	=	Same for IEQCLS = 5
IAMTE(IEQ,1)	=	Number of ammunition types for this equipment, if any
IAMTE(IEQ,2)	=	Number of rounds in a standard load of that ammunition type

Table 6-33. Air Equipment Variables (Continued)

IAMTE(IEQ,3) = Rate of fire of this equipment (rounds/minute)

IAMTE(IEQ,4) = Number of drops per pass (applies to bombs)

IAMTE(IEQ,5) = Distance between drops (meters)

Assume IEQ is a ground equipment type - - that is, IEQCOD(IEQ) $\geq$ 0. Then

IEQCLS(IEQ) = J $\Longrightarrow$ IEQ is in equipment vulnerability Class J with respect to air-delivered weapons, $1 \leq J \leq 5$

Assume IEQ is an air-delivered weapon - - that is, IEQCOD(IEQ) = -2. Then

IEQCLS(IEQ) = 1 $\Longrightarrow$ IEQ is a 250-lb low-drag bomb
= 2 $\Longrightarrow$ IEQ is a 500-lb low-drag bomb
= 3 $\Longrightarrow$ IEQ is a 750-lb low-drag bomb
= 4 $\Longrightarrow$ IEQ is a 1000-lb low-drag bomb
= 5 $\Longrightarrow$ IEQ is a 2000-lb low-drag bomb
= 6 $\Longrightarrow$ IEQ is a 250-lb high-drag bomb
= 7 $\Longrightarrow$ IEQ is a 500-lb high-drag bomb
= 8 $\Longrightarrow$ IEQ is a 750-lb high-drag bomb
= 9 $\Longrightarrow$ IEQ is a Maverick
= 10 $\Longrightarrow$ IEQ is a Shrike
= 11 $\Longrightarrow$ IEQ is 2.75 rockets
= 12 $\Longrightarrow$ IEQ is a 20-mm cannon
= 13 $\Longrightarrow$ IEQ is a CBU-2
= 14 $\Longrightarrow$ IEQ is a Rockeye
= 15 $\Longrightarrow$ IEQ is a Napalm

Air to Ground Sensor Data (For Air Sensors - IEQCOD(IEQ) = -3)

IEQCOD(IEQ) = -3 $\rightarrow$ Equipment IEQ is an Airborne sensor

IPVCE(IEQ,J) = Aircraft Equipment Number of tne J^{th} ($1 \leq J \leq 8$) allowable aircraft type on which air sensor (IEQ) may be used. The first zero encounters implies that no other aircraft can carry this sensor

IMINRE(IEQ) = Minimum range at which sensor may be used

IMAXRE(IEQ,1) = Maximum range at which sensor may be used

ROME(IEQ,1) = Weight of sensor in pounds

Table 6-33. Air Equipment Variables (Continued)

ROME(IEQ,2)	=	Minimum aircraft speed (meters/minute) at which the sensor can be used
ROME(IEQ,3)	=	Maximum aircraft speed (meters/minute) at which the sensor can be used
ROME(IEQ,4)	=	Minimum altitude (meters) at which the sensor can be used
ROME(IEQ,5)	=	Maximum altitude (meters) at which the sensor can be used
ROME(IEQ,6)	=	Maximum angle the sensor can view. Input as SINE
ROME(IEQ,7)	=	Currently not used (proposed: maximum doppler threshold rate of movement for the SLAR).
ROME(IEQ,8)	=	Currently not used (proposed: minimum doppler threshold rate of movement for the SLAR).

Air to Ground sensor data needed:

The maximum and minimum rate of movement of the target at which the target can be detected by the Side Looking Airborne Radar (SLAR). For test purposes these constants are in the program at 600 meters/min and 27 meters/min.

The AIRGRND subroutine uses the following data statements for the sensor equipment type numbers:

LOCAL ARRAY NAME	SENSOR TYPE	CURRENT EQUIPMENT TYPE NUMBER
ISENSR (1)	VISUAL	0 (not used)
ISENSR (2)	SLAR	51
ISENSR (3)	INFRARED	55
ISENSR (4)	KA30 CAMERA	52
ISENSR (5)	KA60 CAMERA	53
ISENSR (6)	36" VERTICAL CAMERA	54

The use of data statements does not allow the sensor types to be position independent in the data base.

The program is written so that the cameras must be assigned the sensor index of 4, 5, 6.

Gathering the data and inputting it to the model, etc., is covered in detail by the general steps listed in Section 6.2.1.

6.2.2.4 <u>How to Change the Weapon Effects Data</u>

Table 6-1 of this User's Manual shows the weapon effects deck to be discussed on page 60 of the <u>Data Base/Operations Manual</u>. This deck does contain all the variables needed to describe the effects of ground fire. Sections 4.1, 4.2, and 4.8 of the <u>User's Manual</u> discuss and also name all the variables in this deck. In this case, the SORT/LIST (programs described in Appendix A) search produces only one of the variables needed as shown below in Table 6-34.

Table 6-34. Variable Indexed on ICDEF

EFFDAT (ICDEF,J)	
	GROUPINGS OF FOUR CONSTANTS (J) TO BE USED WITH THE ICDEF-TH EFFECTS FUNCTIONS (1<=ICDEF<=315)

A complete list of the variables that might be changed for new ground equipment weapon effects is shown below.

NFC — Number of entries in weapon effects look up table.

NPFC — Number of entries in weapon effects table involving personnel targets.

IFNTB (I,J) — Weapon effects look up table is of the form SSXXYZZFADDD, where

IFNTB(I,1) = SSXXYZZ

IFNTB(I,2) = FADDD

I = I - TH (1< = I< = 1000) entry in the weapon effects look up table such that

SS = operational state of target unit (00 => any state)

XX = weapon type

Y = mode of fire (0 => any mode)

ZZ = target personnel vulnerability class or target equipment class (00 => any class)

F = weapon effects function to be used

A = allocation criterion for aimed fire vs. equipment

DDD = number of associated grouping of constants to be used with effects function (1-199)

NXK	Number of groupings of constants, EFFDAT, used in weapon effects computations.
EFFDAT (ICOEF,J)	Groupings of four constants (J) to be used with the ICOEF - TH effects functions. (1 <= ICOEF <= 315)
NDISPR	Number of entries in IDISPR list.
IDISPER (IDF)	Weapon type for which effect function 6(FIRING) is used. (1 <= IDF <= 10)
DISPER (IDF,J)	Constants for use in calculating fraction of rounds falling on the target unit where IDF is the index from IDISPR. (1 <= IDF <= 10), I <= J <= 3 is the number of constants used.

A search of the three miscellaneous decks shown in Table 6-1 yields only one other variable of possible interest, GAF1, which is used in calculating the probability that an air unit is hit by ground support fire.

Again, the gathering and inputting of data is covered in the general steps described in Section 6.2.1.

6.2.2.5 How to Change the Modes of Equipment Operation

Table 6-1 of this User's Manual shows that the needed variables are listed beginning on page 100 of the Data Base/Operations Manual. The operations of these variables are described in Sections 4.17, 4.18, and 4.26 of the User's Manual. Selecting index IMODE from Table 6-27, and using this in the SORT/LIST programs described in Appendix A yields only the 4 variables used with the mode distribution table (shown on Table 6-35), not the mode vectors or the selecting variables.

The complete list of variables for the modes of equipment operation from the Data Base/Operations Manual (starting on page 100) or Sections 4.17, 4.18, and 4.26 of the User's Manual is shown in Table 6-36.

Table 6-35. Variables Indexed on IMODE

```
IAMTE    (IEQ,IMODE)                                                    A2
            (1<=IEQ<=80,1<=IMODE<=8)
            FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
            >= 0), AMMUNITION TYPE USED BY WEAPON TYPE IEQ IN
            MODE OF OPERATION IMODE (0 IMPLIES NO AMMUNITION
            USED).
            FOR AIRCRAFT (IEQCOD(IAC) = -1),
            IMODE = 1 TAKEOFF DELAY TIME FOR THIS AIRCRAFT (MIN.
                    2 LANDING DELAY TIME FOR THIS AIRCRAFT (MIN.
            FOR AIR ORDNANCE (IEQCOD(IAC) = -2),
            IMODE = 1 NUMBER OF AMMUNITION TYPE FOR THIS EQUIP-
                      MENT, IF ANY
                    2 NUMBER OF ROUNDS IN A STANDARD LOAD OF THA
                      AMMUNITION TYPE
                    3 RATE OF FIRE OF THIS EQUIPMENT (ROUNDS/MIN
                    4 NUMBER OF DROPS PER PASS (APPLIES TO BOMBS
                    5 DISTANCE BETWEEN DROPS (METERS)
                    6 DUD PROBABILITY TIMES 100
                    7 KILL PROBABILITY TIMES 100 FOR BRIDGE TYPE
                    8 KILL PROBABILITY TIMES 100 FOR BRIDGE TYPE

IPVCE    (IEQ,IMODE)                                                    A2
            FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
            >= 0), PERSONNEL VULNERABILITY CLASS ASSOCIATED
            WITH EACH MODE IMODE OF EQUIPMENT TYPE IEQ.
            FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD
            (IEQ) = -2 OR -3), EQUIPMENT NUMBER OF THE
            IMODE-TH ALLOWABLE AIRCRAFT TYPE ON WHICH IEQ
            MAY BE USED. (HENCE, A MAXIMUM OF EIGHT AIR-
            CRAFT PER EQUIPMENT TYPE.) THE FIRST ZERO EN-
            COUNTERED IMPLIES NO OTHER ALLOWABLE AIRCRAFT.
            (1<=IEQ<=80,1<=IMODE<=8)
```

Table 6-35. Variables Indexed on IMODE (Continued)

```
ROFE     (IEQ,IMODE)                                                A2
              FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
              >=0), RATE OF FIRE OF WEAPON TYPE IEQ IN EACH MODE
              IMODE (ROUNDS/MINUTE)
              FOR AIRCRAFT (IEQCOD(IEQ) = -1),
              IMODE = 1 FUEL EXPENDITURE FOR LOSING ALTITUDE
                        (LB/METER)
                      2 FUEL EXPENDITURE FOR GAINING ALTITUDE
                        (LB/METER)
                      3 FUEL EXPENDITURE AT MINIMUM SPEED, MINIMUM
                        LOAD, BEST PRESSURE DENSITY (LB/MIN)
                      4 FUEL EXPENDITURE AT CRUISE SPEED (LB/MIN)
                      5 FUEL EXPENDITURE AT MAXIMUM SPEED (LB/MIN)
                      6 RATIO OF FUEL EXPENDITURE RATE AT MAXIMUM
                        LOAD TO FUEL EXPENDITURE RATE AT MINIMUM
                        LOAD
                      7 RATIO OF FUEL EXPENDITURE RATE AT WORST
                        PRESSURE DENSITY TO FUEL EXPENDITURE RATE
                        AT BEST PRESSURE DENSITY
                      8 NOT USED
              FOR AIR ORDNANCE (IEQCOD(IEQ) = -2),
              IMODE = 1 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                        ABILITY CLASS 1 (STANDING) AND WITHIN TAR-
                        GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                      2 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                        ABILITY CLASS 2 (CROUCHING) AND WITHIN TAR
                        GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                      3 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                        ABILITY CLASS 3 (PRONE) AND WITHIN TAR-
                        GET AREA WHO ARE KILLED BY THIS EQUIPMENT
```

Table 6-35. Variables Indexed on IMODE (Continued)

```
                    4 FRACTION OF EQUIPMENT WITH IEQCLS = 1 AND
                      WITHIN TARGET AREA WHICH IS DAMAGED BY
                      THIS EQUIPMENT
                    5 FRACTION OF EQUIPMENT WITH IEQCLS = 2 AND
                      WITHIN TARGET AREA WHICH IS DAMAGED BY
                      THIS EQUIPMENT
                    6 FRACTION OF EQUIPMENT WITH IEQCLS = 3 AND
                      WITHIN TARGET AREA WHICH IS DAMAGED BY
                      THIS EQUIPMENT
                    7 FRACTION OF EQUIPMENT WITH IEQCLS = 4 AND
                      WITHIN TARGET AREA WHICH IS DAMAGED BY
                      THIS EQUIPMENT
                    8 FRACTION OF EQUIPMENT WITH IEQCLS = 5 AND
                      WITHIN TARGET AREA WHICH IS DAMAGED BY
                      THIS EQUIPMENT
              (1<=IEQ<=80,1<=IMODE<=8)

ROME     (IEQ,IMODE)                                               A2
              FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
              >= 0), RATE OF MOVEMENT (IN METERS/MINUTE) OF WEAPON
              TYPE I IN MODE IMODE (UNOBSTRUCTED).
              FOR AIRCRAFT (IEQCOD(IEQ) = -1),
              IMODE = 1 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                      AT BEST MODELED PRESSURE DENSITY (PDBEST)
                    = 2 MAXIMUM ALTITUED OF AIRCRAFT (METERS)
                    = 3 MINIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 4 CRUISE SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 5 MAXIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
                    = 6 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                      AT WORST MODELED PRESSURE DENSITY (PDWORST
                      THE CORRECT NEGATIVE VALUE WILL INSURE
                      THAT AN AIRCRAFT CANNOT FLY AT PRESSURE
                      DENSITIES BELOW ITS CAPABILITY
```

Table 6-35. Variables Indexed on IMODE (Continued)

```
      = 7 POOREST METEOROLOGICAL VISIBILITY IN WHICH
          AIRCRAFT CAN CONTINUE ITS MISSION (METERS)
      = 8 NOT USED
FOR EQUIPMENT OTHER THAN AIRCRAFT (IEQCOD(IEQ) =
-2 OR -3),
IMODE = 1 WEIGHT OF EQUIPMENT (POUNDS) INCLUDING
          STANDARD AMMUNITION LOAD
      = 2 MINIMUM AIRCRAFT SPEED (METERS/MINUTE) AT
          WHICH EQUIPMENT CAN BE USED
      = 3 MAXIMUM SPEED AT WHICH EQUIPMENT CAN BE
          USED (METERS/MINUTE)
      = 4 MINIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE
          USED (METERS)
      = 5 MAXIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE
      = 6 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
          CRATER RADIUS (METERS) AGAINST ROAD TYPE 1
      = 7 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
          CRATER RADIUS (METERS) AGAINST ROAD TYPE 2
      = 8 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
          CRATER RADIUS (METERS) AGAINST ROAD TYPE 3
(1<=IEQ<=80,1<=IMODE<=8)
```

Table 6-36. Modes of Equipment Operation Variables

MURTAB (I,J)	Represents the two break ranges (in meters) and three mode distribution vector numbers corresponding to each mode selection code I used to select mode distribution vectors as function of range. (1<=I<=150, 1<=J<=5)
MUSLCT (I)	Mode selection codes in the form WWXXYYZZ. Such that WW = weapon unit state XX = target unit state (=99 for no target) YY = target unit type (=99 for no target) ZZ = equipment type (=99 for support fire weapon) 00 in any position means equality of look up value. Equality means use MURTAB (I,J) (J = 1,5) to select mode distribution vector. (1<=I<=150)
NMU	Number of mode distribution vectors.
NRMU	Number of mode selection codes.
XMUTAB (I,J)	Mode distribution vectors. XMUTAB (I,J) is fraction of equipment operating in mode J when mode distribution vector I has been selected by use of tables MUSLCT and MURTAB, I = 1,80 and J = 1,8.

A search of the 3 miscellaneous decks listed in Table 6-1 yields only one variable of possible interest, NMODES, which is the maximum number of modes, currently set at 8. Since reducing this number would only reduce the spaces of IAMTE, IPVCE, ROFE, ROME, and XMUTAB which could be used, it probably will always be equal to 8.

The remaining steps needed to change these variables and input them to the model are completely covered in the general steps described in Section 6.2.1.

APPENDIX A - NOMENCLATURE

A.1 NOMENCLATURE PROGRAM DESCRIPTION

A.1.1 General

A list of CATTS global variables can be generated by means of two programs, SORT (Figure A-1) and LIST (Figure A-2), and an input deck of variable definitions. The input deck consists of a set of cards or card images for each variable defined. The first card for each variable contains the variable name, index names, if any, and the name of the common blocks the variable is in. Following this header card is a set of text cards that provide a description of the variable. Variable units and the allowable range of indexes are included in the description.

Program SORT is used to input a list of variable definitions and to output the same list alphabetized by variable name. This output list is stored on disk for use by program LIST. The second program (LIST) is used to input listing requests and output listings of variables so requested. Subroutine SORT (Figure A-3) is utilized by both programs for alphabetizing lists of variable names. A standard bubble sort is used by this routine. Subroutine ERROUT (Figure A-4) is utilized by program SORT for printing error messages.

A maximum of 10,000 input cards are allowed consisting of a maximum of 4,000 separate variables. Program LIST may be run either as a batch job from the card reader or interactively from the CATTS main computer console.

Program LIST is used to extract data for the various output options available, and to write the report requested. LIST will generate the following types of nomenclature lists:

- All variables (alphabetized)
- Specified variables only
- All variables organized by common blocks
- Variables in specified common blocks only
- Variables organized by index for all indexes
- Variables organized by index for specified indexes only

```
C  THIS PROGRAM READS ON LU1 NOMENCLATURE VARIABLES, ALPHABATIZES THEM AND
C  WRITES THEM OUT ON LU 3.  LU 2 IS SCRATCH, LU 4 IS FOR LISTINGS.
      DIMENSION IN(20),IBUF(3,4000)
      IREC = 0
      IVAR = 0
C  READ NEXT CARD
10    READ(1,1,END=20) IN
1     FORMAT(20A4)
      IREC=IREC +1
      CALL WDISK(3HF:2,IN,IREC,20)
      IF(IAND(IN(1),8Z80000000).EQ.0)GO TO 10
C  A NEW VARIABLE
      IVAR=IVAR+1
      IBUF(1,IVAR)=IN(1)
      IBUF(2,IVAR)=IN(2)
      IF(IBUF(2,IVAR).EQ.1H )IBUF(2,IVAR)=8Z80404040
      IBUF(3,IVAR)=IREC
      GO TO 10
20    IN(1)=1H*
      DO 21 I=2,20
21    IN(I)=1H
      CALL WDISK(3HF:2,IN,IREC+1,20)
C  SORT WHAT YOU READ
      CALL SORT(IBUF,IVAR)
C  MAKE NEW FILE
      IREC=0
      DO 300 I=1,IVAR
      IFLAG=0
      J=0
310   CALL RDISK(3HF:2,IN,IBUF(3,I)+J,20)
      IF(IFLAG.EQ.0)GO TO 320
      IF(IN(1).NE.1H )GO TO 300
320   IREC=IREC+1
      CALL WDISK(3HF:3,IN,IREC,20)
      IFLAG=1
      J=J+1
      GO TO 310
300   CONTINUE
      IN(1)=1H*
```

Figure A-1. Program SORT

```
        DO 301 I=2,20
301     IN(I)=1H
        CALL WDISK(3HF13,IN,IREC+1,20)
        WRITE(4,399)
399     FORMAT(1H1)
C  LIST SORTED FILE
        IREC=1
400     CALL RDISK(3HF13,IN,IREC,20)
C  CHECK FOR END
        IF(IN(1).EQ.1H*)STOP
        WRITE(4,401)IREC,IN
401     FORMAT(I5,3X,20A4)
        IREC=IREC+1
        GO TO 400
        END
```

Figure A-1. Program SORT (Cont'd)

```
C     THIS PROGRAM LISTS NOMENCLATURE VARIABLES ON LU 4.  VARIABLES ARE TAKEN FROM
C     LU 1.  INSTRUCTIONS ARE TAKEN FROM LU 2.
      DIMENSION IWHAT(2),IHOW(2),IBUF(3,4000),IN(20),IDUM(2)
C     READ INSTRUCTIONS
      READ(2,1)IWHAT
    1 FORMAT(2A4)
C     'LIST' MEANS LIST ALL OR REQUESTED VARIABLES ALPHAVETICALLY
C     'COMM' MEANS LIST ALL OR REQUESTED COMMON BLACKS ALPHABETICALLY
C     'INDX' MEANS LIST ALL OR REQUESTED INDECIES ALPHABETICALLY WITH VARIABLES US-
C     ING THEM
      WRITE(4,2)
    2 FORMAT(1H1)
      READ(2,1) IHOW
C     '*    ' MEANS LIST ALL SUCH VARIABLES
C     'XXXXXXXX' LIST VARIABLE WITH NAME XXXXXXXX, COMMON BLOCK OR INDES- MUST BE
C     LEFT JUSTIFIED
C
C     SEE IF SORTING IS REQUIRED
      IF(IWHAT(1).EQ.4HLIST.AND.IHOW(1).EQ.1H*)GO TO 100
C     SORTING REQUIRED
      IF(IWHAT(1).NE.4HLIST)GO TO 10
C     FIND RECORD NUMBERS FOR VARIABLE NAMES
      IREC =0
      IPT=1
    5 IREC=IREC+1
      CALL RDISK(3HF:1,IN,IREC,20)
      IF(IN(1).EQ.1H*)GO TO 100
      IF(IN(1).EQ.1H )GO TO 5
      IBUF(1,IPT)=IN(1)
      IBUF(2,IPT)=IN(2)
      IBUF(3,IPT)=IREC
      IPT=IPT+1
      GO TO 5
   10 IF(IWHAT(1).NE.4HCOMM)GO TO 50
C     SORT ON COMMON BLOCKS
      IREC=0
      ICOM=1
   11 IREC=IREC+1
      CALL RDISK(3HF:1,IN,IREC,20)
```

Figure A-2. Program LIST

```
          IF(IN(1).EQ.1H*)GO TO 40
          IF(IN(19).EQ.1H )GO TO 11
          IBUF(1,ICOM)=IN(19)
          IF(IN(20).EQ.1H )IN(20)=8Z80404040
          IBUF(2,ICOM)=IN(20)
          IBUF(3,ICOM)=IREC
          ICOM=ICOM+1
          GO TO 11
 40       CONTINUE
 C   DO THE SORT
          CALL SORT(IBUF,ICOM)
          GO TO 100
 50       CONTINUE
 C   CHECK FOR INDX
          IF(IWHAT(1).NE.4HINDX)CALL ERROUT(IWHAT,2)
 C   SORT ON INDECIES
          IREC=0
          INDEX=0
 51       IREC=IREC+1
          CALL RDISK(3HF:1,IN,IREC,20)
          IF(IN(1).EQ.1H*)GO TO 90
          IF(IN(3).EQ.1H )GO TO 51
 C   GET OUT ALL INDEX NAMES
          IDUM(1)=1H
          IDUM(2)=8Z80404040
          IGET=9
          IPUT=0
          ICOM=0
 952      LW,1 IGET
 S        LB,2 IN,1
 S        CI,2 X'6B'       COMMA
 S        BE 60S
 S        CI,2 X'5D'       RIGHT PAREN
 S        BE 61S
 S        LW,1 IPUT
 S        STB,2 IDUM,1
          IGET=IGET+1
          IPUT=IPUT+1
          IF(IPUT.GT.7.OR.IGET.GT.36)CALL ERROUT(IN,20)
          GO TO 52
```

Figure A-2. Program LIST (Cont'd)

```
60    ICOM=1
C  STORE INDEX NAME AND LOCATION
61    INDEX=INDEX+1
      IBUF(1,INDEX)=IDUM(1)
      IBUF(2,INDEX)=IDUM(2)
      IBUF(3,INDEX)=IREC
      IGET=IGET+1
      IPUT=0
      IF(ICOM.EQ.0)GO TO 51
      ICOM=0
      IDUM(1)=1H
      IDUM(2)=8Z80404040
      GO TO 52
90    CALL SORT(IBUF,INDEX)
C  PRINT OUT WHAT IS REQUESTED
100   IF(IHOW(1).NE.1H*)GO TO 200
C  ALL IS REQUESTED
      IF(IWHAT(1).NE.4HLIST)GO TO 130
C  ALL VARIABLES
      IREC=1
110   CALL RDISK(3HF:1,IN,IREC,20)
      IF(IN(1).EQ.1H*)STOP
      WRITE(4,111)IREC,IN
111   FORMAT(I5,3X,20A4)
      IREC=IREC+1
      GO TO 110
130   CONTINUE
      IF(IWHAT(1).NE.4HCOMM)GO TO 170
C  LIST ALL COMMON BLOCKS
      IDUM(1)=IDUM(2)=1H
      DO 135 I=1,ICOM
      IF(IBUF(2,I).EQ.8Z80404040)IBUF(2,I)=1H
      IF(IDUM(1).NE.IBUF(1,I).OR.IDUM(2).NE.IBUF(2,I))WRITE(4,131)
     1      IBUF(1,I),IBUF(2,I)
131   FORMAT(//,' COMMON/',2A4,'/')
      IDUM(1)=IBUF(1,I)
      IDUM(2)=IBUF(2,I)
      J=0
132   CALL RDISK(3HF:1,IN,IBUF(3,I)+J,20)
      IF(J.EQ.0)GO TO 134
```

Figure A-2. Program LIST (Cont'd)

```
            IF(IN(1).NE.1H )GO TO 135
      C  NOT THE END OF THIS VARIABLE
      134   WRITE(4,133)IN
      133   FORMAT(5X,20A4)
            J=J+1
            GO TO 132
      135   CONTINUE
            STOP
      170   IF(IWHAT(1).NE.4HINDX)CALL ERROUT(IWHAT,2)
      C  LIST ALL INDECIES
            IDUM(1)=IDUM(2)=1H
            DO 185 I=1,INDEX
            IF(IBUF(2,I).EQ.8Z80404040)IBUF(2,I)=1H
            IF(IDUM(1).NE.IBUF(1,I).OR.IDUM(2).NE.IBUF(2,I))WRITE(4,171)
         1        IBUF(1,I),IBUF(2,I)
      171   FORMAT(//,2X,2A4)
            IDUM(1)=IBUF(1,I)
            IDUM(2)=IBUF(2,I)
            J=0
      172   CALL RDISK(3HF:1,IN,IBUF(3,I)+J,20)
            IF(J.EQ.0) GO TO 174
            IF(IN(1).NE.1H )GO TO 185
      C  NOT END OF THIS VARIABLE
      174   WRITE(4,133)IN
            J=J+1
            GO TO 172
      185   CONTINUE
            STOP
      200   CONTINUE
      C  LIST ONLY WHAT IS REQUESTED
            IF(IWHAT(1).EQ.4HLIST)IEND=IPT
            IF(IWHAT(1).EQ.4HCOMM)IEND=ICOM
            IF(IWHAT(1).EQ.4HINDX) IEND=INDEX
      210   FORMAT(//,2X,2A4)
      211   CONTINUE
            WRITE(4,210) IHOW
            IF(IHOW(2).EQ.1H )IHOW(2)=8Z80404040
            DO 220 I=1,IEND
            IF(IBUF(1,I).NE.IHOW(1).OR.IBUF(2,I).NE.IHOW(2))GO TO 220
            J=0
```

Figure A-2. Program LIST (Cont'd)

```
214   CALL RDISK(3HF:1,IN,IBUF(3,I)+J,20)
      IF(J.EQ.0)GO TO 215
      IF(IN(1).NE.1H )GO TO 220
215   WRITE(4,133)IN
      J=J+1
      GO TO 214
220   CONTINUE
      READ(2,1,END=225)IHOW
      IF(IHOW(1).EQ.1H*)GO TO 225
      GO TO 211
225   STOP
      END
```

Figure A-2. Program LIST (Cont'd)

```
      SUBROUTINE SORT(IBUF,IEND)
C  THIS ROUTINE SORTS ATRAY IBUF(3,IEND) ON IBUF(1,I) AND IBUF(2,I)FOR ENTRY I.
      DIMENSION IBUF(3,1)
C  SORT ON INDEX 2 FIRST
      DO 100 I=2,1,-1
105   ICHANGE = 0
      DO 200 J=1,IEND-1
      IF(IBUF(I,J).LE.IBUF(I,J+1))GO TO 200
      DO 110 K=1,3
      IDUM=IBUF(K,J)
      IBUF(K,J)=IBUF(K,J+1)
110   IBUF(K,J+1)=IDUM
      ICHANGE=1
200   CONTINUE
      IF(ICHANGE.EQ.0)GO TO 100
      GO TO 105
100   CONTINUE
      RETURN
      END
```

Figure A-3. Subroutine SORT

```
      SUBROUTINE ERROUT(IN,J)
C  THIS IS AN ERROR ABORT ROUTINE
      DIMENSION IN(1)
      DIMENSION IL(34)
      J1=MIN(J,34)
      DO 1 I=1,34
1     IL(I)=1H
      DO 2 I=1,J1
2     IL(I)=IN(I)
      WRITE(4,10)IL
10    FORMAT(' ERROR DUE TO',/,34A4)
      STOP
      END
```

Figure A-4. Subroutine ERROUT

Programs SORT and LIST are set up to run on the CATTS $\Sigma 9$ computer. The options available and the LIST variable values that correspond to them are defined in the comment section at the beginning of the LIST listing.

The remainder of this write-up contains a more detailed description of the SORT and LIST programs, a discussion on how to use the programs (including control cards for use on the CATTS $\Sigma 9$ computer system), commented listings of the routines, and a sample of input and output data.

A.1.2 Program SORT

Program SORT, presented in the commented listing of Figure A-1, begins by reading in and processing the input data, a sample of which is shown in Figure A-5. Processing is performed on a card-by-card basis; if the first character position on the card is non-blank, the first eight characters on the card are placed in array IBUFF, followed by the number of the card containing the variable name. For example, if the 37th card read has VARIABLE starting in column 1, then IBUF(1,I) = 4HVARI, IBUF(2,I) = 4HABLE and IBUF(3,I) = 37. "I" is an integer indicating that this is the Ith variable card read. As soon as this processing is performed on each card, the card is written onto a temporary file. When all cards have been read in, the array IBUF is sorted (i.e., alphabetized) by a call to subroutine SORT.

Using the sorted array IBUF, program SORT then proceeds to set up the alphabetized mass storage file. Variable names are taken one at a time from array IBUF. The position on the temporary file containing the variable definition is noted. The variable description is then read from the temporary file and written to the permanent alphabetized file. This process is continued until all variable descriptions have been transferred to the permanent file. Finally, SORT prints all of the sorted card images.

A.1.3 Program LIST

Program LIST, presented in the commented listing of Figure A-2, is used to generate nomenclature reports. The reports it generates are all based on extracting data for specific variables, common blocks, or index

```
ADIPR    (IUT,ICOLOR,K)                                                   C
                 FRACTION OF UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE
                 (ICOLOR=2), CAN BE EXPECTED TO BE ACQUIRED AT ANY
                 GIVEN TIME DUE TO AERIAL SURVEILLANCE; (K=1) TARGET
                 UNIT IN ENGAGEMENT REGION, (K=2) TARGET UNIT
                 OUTSIDE ENGAGEMENT REGION.  (1<=IUT<=20)
AIRBORT (JAU)                                                             WPNUMBR
                 LOGICAL VARIABLE TO INDICATE IF  AN AIR UNIT MISSION
                 HAS BEEN ABORTED =.TRUE. IF ABORTED ; =.FALSE. IF
                 NOT ;  1<= JAU <=10
AIROMU   (JUT,JCOLOR)                                                    C
                 RATE OF MOVEMENT (METERS/MINUTE) FOR UNIT OF GIVEN
                 TYPE JUT WITH TRAVEL CODE EQUAL TO 4(AIRBORNE),
                 RED (JCOLOR=1), BLUE (JCOLOR=2) (1<=JUT<=20)
ALERTFAC(I)                                                               VISUALIN
                 ALERTNESS FACTORS :
                   I=1    DEGRADATION FACTOR FOR THE ENGAGING OBSERVER
                          UNIT
                   I=2    ENHANCEMENT FACTOR FOR THE AURAL CUE
                   I=3    EHANCEMENT FACTOR FOR THE ENGAGING TARGET
                          UNIT
ALL                                                                       WEATHR
                 GLOBAL AMBIENT LIGHT LEVEL (FOOT LAMBERTS)
ALLEVEL (I)                                                               VISUAL
                 MAXIMUM LIGHT LEVEL (IN FOOT LAMBERTS) FOR DIFFERENT
                 (I) OF MOON
                   I=1  STAR LIGHT
                   I=2  1/4 MOON
                   I=3  1/2 MOON
                   I=4  FULL MOON
AMAX                                                                      OUSER
                 MAXIMUM RANGE (IN METERS) FOR AURAL DETECTION.
AMINFC                                                                    OUSER
                 FIRE FACTOR GETS BELOW THIS VALUE WILL BE SET TO 0
AMOREV                                                                    REVEAP
                 THRESHOLD (IN TERMS OF FRACTION OF BASIC LOAD) FOR
                 CURRENT AMMUNITION LOAD. WHEN ONE OR MORE AMMO
                 LOADS OF A UNIT IS LOWER THAN THIS THRESHOLD,
                 AN AMMO RESUPPLY ALERT IS GENERATED
AMPHBUS                                                                   ENGFACT
                 TIME IN HOURS REQUIRED TO CONDUCT AN AMPHIBIOUS
                 LANDING OPERATION
```

Figure A-5. Sample Input

names. The first operation performed by the program is to read in the type of listing (mode) that is being requested (see Section A.1.4 for mode descriptions). Next, the method of display of the mode is determined. This is done by reading in the display method (see Section A.1.4 for display methods). Next, it is determined whether sorting is required.

Sorting is performed for all tasks except listing all variables. For each type of sorting (variable, common block or index) the permanent file is read sequentially and common block names, index names or variable names are searched for. As the desired text is found, it is stored in array IBUF along with a pointer indicating on what card image the text may be found. When all of the permanent file has been read, subroutine SORT is called to alphabetize the text strings found in IBUF.

If sorting is not required, all variables are being requested and the permanent file is simply read card by card and listed. In all other cases, involving all variables, the alphabetized array IBUF is interrogated entry by entry and the card numbers so found are read from the permanent file and listed along with all following cards until a new variable card is found. In cases where specific variables are requested, the variables are read one at a time. As each variable is read, references to it in IBUF are located and the permanent file entries pointed to are read and listed. Listing continues until a new variable card is read.

A.1.4 Operation

In order to perform the sorting and listing tasks outlined above, a large amount of disk area is required. Since such a large continuous area is not currently available on the CATTS system, a means of temporarily relocating an area for sorting and listing was devised. At the end of the listing and sorting task, this area is replaced as it appeared before the task. The area chosen for performing the listing and sorting task is area D5. This area currently holds file SAVE32 used for saving hours 13 through 16 of a CATTS simulation.

Two decks of cards (along with the nomenclature definition cards described in Figure A-5) are required for listing and sorting. The first deck, labelled SORT, is used to clear area D5, allocate files for the listing and sorting operations, compile the required programs and load these programs. The second deck, labelled FIX, is run at the conclusion

of the listing and sorting task. This deck re-allocates file SAVE32 in area D5.

The user begins the listing and sorting task by loading the first deck of cards into the card reader. He then runs the job contained within this deck. When this job has concluded, the user is ready to begin the sorting operation. The steps performed in this task are as follows:

1. Load the nomenclature definition cards into the card reader. (If another input medium, such as magnetic tape, is being utilized load the appropriate input device).
2. Place a !EOD card at the end of the input card deck. (End of file mark on magnetic tape is required.)
3. * Key interrupt TYC at the main console.
4. Type !JOB.
5. If the card reader is not being utilized as the input device type !STDLB (SI, device label), (e.g., !STDLB (SI, 9T)).
6. Type !RUN D5,SORT.

* If these control cards are input from the card reader, omit this step.

At this point, all of the input cards will be read and an alphabetized list of these cards will be printed on the line printer. The listing program is now ready for operation. Listing is accomplished by the following controlled cards.

!JOB

!STDLB (SI, input device), (e.g., !STDLB (SI,TY) - for interaction at main console). This card may be omitted if card reader is being used to input commands.

!RUN D5,LIST

At this point, the program is waiting for commands from the input device. All commands must be input left justified. The first command describes the type or mode of sorting that is being requested. Three sorting types are available. These are:

LIST - list variables. In this mode, variables and their definitions will be listed.

COMM - list common blocks. In this mode, common blocks along with all variables contained within them will be listed.

INDX - list indexing variables. In this mode, variables used as indexes will be listed along with the variables that they index.

After the sorting type has been selected, the program will be waiting for commands indicating which variables, common blocks or indexes are to be listed. Two bytes of input are accepted at this point.

* - list all variables, common blocks or indexes alphabetically.

or

Variable 1

Variable 2
"
"
Variable n

* - list variables, common blocks, or indexes contained in this list. "*" indicates the end of the list.

After the requested listings have been printed, the program will terminate. Alternate modes may now be accessed by simply rerunning LIST:

!RUN D5,LIST

and inputing new commands.

When all desired listings have been obtained, the job making up the FIX deck should be run.

Note: *The math model will not be able to be run until* FIX is executed.

A.1.5 Data Format

The input deck must have the following format.

Header Card

Variable name (left justified)	Index names, separated by commas, surrounded by ( ) (left justified - no spaces allowed)	Not Used	Common block name (left justified)
1 8	9 38	39 72	73 80

Text Cards

Leave Blank	Hollerith nomenclature text data	Leave Blank
1 8	9 72	73 80

There may be any number of text cards for each header card.

A.2 NOMENCLATURE LIST

This section presents an alphabetized listing of all of the variables (input and output) that are used in the CATTS mathematical model (background software). Included are definitions of the meaning of these variables, units of measurement, allowable range of indexes, and identification of the common blocks containing the variables.

Also included, on the first line, are the names of the subroutines that read in the variables. These routine names appear in Table 6-1 of the User's Manual, and the information on this table will give the user the location of the data used for the variables on the Data Base file. This information also shows the user which of Sections 3 and 4 will provide more detail on the variable. Two of the names are really input deck names:

1) MISCVAR is the miscellaneous variable input deck at the front of the data base file, read by subroutine INPUT.
2) NAMELIST means the namelist cards input at run time, or the namelist portion of the data base disk file (at the end of the file) both read by subroutine INPUT. Also refer to the Data Base/Operations Manual, Appendix A.

Some of the variables, specifically LISTUN, LALL, LBATLN, LCOMPNY, LPLTN, NOALL, NOBATLN, NOCOMPNY, and NOPLTN, are filled by subroutine MKUNLIST processing data read in to create the values for the variables rather than simply reading the value from the data base into the variable. The values for most variables are simply read in straight from the data base disk file.

Text Cards

Leave Blank	Hollerith nomenclature text data	Leave Blank
1 — 8	9 — 72	73 — 80

There may be any number of text cards for each header card.

A.2 NOMENCLATURE LIST

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```
ADTPR    (IUNTYP,ICOLOR,K)              TAINP                          C
           NOT USED IN CATTS.
           FRACTION OF UNIT TYPE IUNTYP, RED(ICOLOR=1) OR BLUE
           (ICOLOR=2), CAN BE EXPECTED TO BE ACQUIRED AT ANY
           GIVEN TIME DUE TO AERIAL SURVEILLANCE; (K=1) TARGET
           UNIT IN ENGAGEMENT REGION, (K=2) TARGET UNIT
           OUTSIDE ENGAGEMENT REGION.  (1<=IUNTYP<=20)

AIRBORT (JAU)                                                          WPNUMBR
           LOGICAL VARIABLE TO INDICATE IF  AN AIR UNIT MISSION
           HAS BEEN ABORTED =.TRUE. IF ABORTED ; =.FALSE. IF
           NOT ;  1<= JAU <=10

AIROMU   (JUT,JCOLOR)                   UTINP                          C
           RATE OF MOVEMENT (METERS/MINUTE) FOR UNIT OF GIVEN
           TYPE JUT WITH TRAVEL CODE EQUAL TO 4(AIRBORNE),
           RED (JCOLOR=1), BLUE (JCOLOR=2) (1<=JUT<=20)
           NOT USED IN CATTS.

ALERTFAC(I)                             SENSINP                        VISUALIN
           ALERTNESS FACTORS :
             I=1    DEGRADATION FACTOR FOR THE ENGAGING OBSERVER
                    UNIT
             I=2    ENHANCEMENT FACTOR FOR THE AURAL CUE
             I=3    EHANCEMENT FACTOR FOR THE ENGAGING TARGET
                    UNIT

ALL                                                                    WEATHR
           GLOBAL AMBIENT LIGHT LEVEL (FOOT LAMBERTS)

ALLEVEL (I)                             SENSINP                        VISUALIN
           MAXIMUM LIGHT LEVEL (IN FOOT LAMBERTS) FOR DIFFERENT
           (I) OF MOON
             I=1  STAR LIGHT
```

```
                I=2   1/4 MOON
                I=3   1/2 MOON
                I=4   FULL MOON

AMAX                             SENSINP                        DUSER
              MAXIMUM RANGE (IN METERS) FOR AURAL DETECTION.

AMINFC                           SENSINP                        DUSER
              FIRE FACTOR GETS BELOW THIS VALUE WILL BE SET TO 0

AMOREV                           NAMELIST                       REVEAP
              THRESHOLD (IN TERMS OF FRACTION OF BASIC LOAD) FOR
              CURRENT AMMUNITION LOAD. WHEN ONE OR MORE AMMO
              LOADS OF A UNIT IS LOWER THAN THIS THRESHOLD,
              AN AMMO RESUPPLY ALERT IS GENERATED

AMPHBUS                          NAMELIST                       ENGFACT
              TIME IN HOURS REQUIRED TO CONDUCT AN AMPHIBIOUS
              LANDING OPERATION

ARANGE                           SENSINP                        AURALIN
              MAXIMUM DISTANCE (IN METERS) BETWEEN EVERY TWO UNITS
              THAT AURAL DETECTION COULD OCCUR.

ATER                             SENSINP                        AURALIN
              TERRAIN ATTENUATION COEFFICIENT FOR AURAL DETECTION

AVTM                                                            ELTIMES
              AVERAGE TIME SPENT IN TIMSTRT AND TMSTP IN KEEPING
              THE STATISTICS.  THIS IS CALCULATED IN MAIN PROGRAM.

BANDAL  (IBDS,IBD)               FSINP                          U
              FOR EACH BAND SET, ALLOCATION FACTOR TO BE USED
              WITH EACH BAND. MAY BE EITHER THE FRACTION OF
```

```
            AVAILABLE FIREPOWER TO BE USED ON THE BAND OR
            THE RELATIVE WEIGHTING FACTOR TO BE USED IN AS-
            SIGNING FIREPOWER TO TARGETS IN THE BAND. INDICES
            ARE SAME AS FOR IBANDP. (1<=IBDS<=9,1<=IBD<=4)

BDFRAC  (IBDS,IBD)                                                U
            FACTOR OF EACH BAND BY WHICH TO MULTIPLY A GIVEN
            TARGET ALLOCATION VALUE IN ORDER TO GIVE FRACTION
            OF WEAPONS TO ALLOCATE TO THE TARGET. INDICES
            CORRESPOND TO THOSE OF BNDSUM. (1<=IBDS<=4,
            1<=IBD<=2)

BDIR    (JU,J)                                                    SINCOS
            SINE AND COSINE OF ANGLE FACED BY UNIT JU
            DURING PRECEDING TIMESTEP-CARTESIAN
            COORDINATE SYSTEM
            J=1 SINE  OF ANGLE OF UNIT JU
            J=2 COSINE OF ANGLE OF UNIT JU
            BDIR IS COPIED FROM PDIR (COMMON BSTAT) EACH MINUTE
            AND IS USED BY FORE-GROUND DISPLAY (1<=JU<=100)

BDMGTHRS                          ROADINP                         DAMAGE
            DAMAGE THRESHOLD SUCH THAT MOVEMENT ACROSS A BRIDGE
            IS NOT PERMITTED

BEYOND                            NAMELIST                        PASSOBST
            THE DISTANCE (IN METERS) AWAY FROM THE EXIT POINT
            OUT OF AN AREA OBSTACLE;  USED TO DETERMINE A DES-
            TINATION POINT WHEN CROSSING AN AREA OBSTACLE

BLAVGAS (JU)                                                      AVFUEL
            BASIC LOAD OF AVIATION FUEL (IN GALLONS) FOR UNIT JU
            (1<=JU<=100)

BLDIES  (JU)                                                      UNFUEL
            BASIC LOAD (INITIAL AMOUNT) OF DIESEL FUEL (IN
```

```
                 GALLONS) FOR UNIT JU (1<=JU<=100)

BLGAS    (JU)                                                          UNFUEL
                 BASIC LOAD (INITIAL AMOUNT) OF GAS FOR UNIT
                 JU (1<=JU<=100) IN GALLONS.

BNDSUM  (I,J)                                                          U
                 FOR I TH BAND(1<=I<=4), TOTAL TARGET ALLOCATION
                 VALUE IN A BAND ; (J=1) FOR MODE 6 ,(J=2) FOR MODE 8

BNLD                                     SENSINP                       AURALIN
                 BACKGROUND NOISE LEVEL (IN DB) FOR THE DOMINANT
                 VEGETATION CLASS IN THIS SCENARIO AT DAY TIME.

BNLN                                     SENSINP                       AURALIN
                 BACKGROUND NOISE LEVEL (IN DB) FOR THE DOMINANT
                 VEGETATION CLASS IN THIS SCENARIO AT NIGHT.

BRCHDIST                                                               ODIST
                 THE SHORTEST PATH (IN METERS) TAKEN BY A GIVEN UNIT
                 TO BREACH A MINEFIELD

BRGDMGE (JBR)                                                          DAMAGE
                 FRACTION OF BRIDGE JBR DAMAGED (1<=JBR<=16)

BROMU    (JU)                                                          MOVERATE
                 RATE OF MOVEMENT OF UNIT JU IN METERS/MIN FOR THE
                 PRECEDING TIMESTEP.  (1<=JU<=100)

CACOEFF                                  SENSINP                       VISUALIN
                 COEFFICIENT USED IN THE CALCULATION OF APPARENT
                 CONTRAST
```

```
CASCTR                                                                       P
                    CASUALTY COUNTER .

CASTAB  (JPVC)                                                               P
                    NUMBER OF CASUALTIES IN PERSONNEL VULNERABILTY CLASS
                    JPVC OF A UNIT (TEMPORARY)  (1<=JPVC<=6)

CLAVGAS (JU)                                                                 AVFUEL
                    THE CURRENT LOAD OF AVIATION FUEL (IN GALLONS) FOR
                    UNIT JU  (1<=JU<=100)

CLDIES  (JU)                                                                 UNFUEL
                    CURRENT LOAD (AVIATION AMOUNT) OF DIESEL FUEL FOR
                    UNIT JU (1<=JU<=100) IN GALLONS

CLGAS   (JU)                                                                 UNFUEL
                    CURRENT LOAD (PRESENT AMOUNT) OF GAS FOR EACH OF
                    UNIT JU (1<=JU<=100) IN GALLONS

CONSMAC (I)                                     SENSINP                      AURALINP
                    THE I TH COEFFICIENT TO CALCULATE THE MOLECULAR
                    ABSORPTION COEFFICIENT :
                      I=1  FIRST COEFF. TO CAL. THE TEMPERATURE SHIFT
                      I=2  SECOND COEFF. TO CAL. THE TEMPERATURE SHIFT
                      I=3  THIRD COEFF. TO CAL. THE TEMPERATURE SHIFT
                      I=4  FOURTH  COEFF. TO CAL. THE TEMPERATURE SHIFT
                      I=5  FIFTH   COEFF. TO CAL. THE TEMPERATURE SHIFT
                      I=6  FIRST   COEFF. TO CAL. THE X-VALUE
                      I=7  SECOND  COEFF. TO CAL. THE X-VALUE
                      I=8  FIRST  COEFF. TO CAL. THE Y-VALUE
                      I=9  SECOND COEFF. TO CAL. THE Y-VALUE
                      I=10 THIRD  COEFF. TO CAL. THE Y-VALUE
                      I=11 FOURTH COEFF. TO CAL. THE Y-VALUE
                      I=12 FIFTH  COEFF. TO CAL. THE Y-VALUE
                      I=13 FIRST  COEFF. FOR THE FORMULA OF AMOLE
                      I=14 SECOND COEFF. FOR THE FORMULA OF AMOLE
                      I=15 METRIC CONVERSION FACTOR
```

```
            I=16 X-SCALE SHIFT CONSTANT
            I=17 TEMPERATURE SHIFT CONSTANT

CPDEADP                        NAMELIST                         CPDEAD
          THE MINIMUM FRACTION OF ORIGINAL PERSONNEL WHICH MAY
          REMAIN IN A COMMAND AND CONTROL HEADQUARTERS UNIT
          BEFORE IT IS CONSIDERED TO HAVE BEEN DESTROYED FOR
          PURPOSES OF COMMUNICATION INTERRUPTION.

CPDEADV                        NAMELIST                         CPDEAD
          THE MINIMUM FRACTION OF ORIGINAL VEHICLES WHICH MAY
          REMAIN IN A COMMAND AND CONTROL HEADQUARTERS UNIT
          BEFORE IT IS CONSIDERED DESTROYED FOR PURPOSES OF
          COMMUNICATIONS INTERRUPTION.

CPERC    (JU)                                                   FIRALRT
          THE I-TH HALF WORD OF CPERC IS USED TO CONTROL
          TEMPORARY CASUALTY REPORTS FOR UNIT I RESULTING
          FROM REACHING THE PERSONNEL CASUALTY THRESHOLD.
          THE I-TH HALF WORD IS SET EQUAL TO THE CURRENT
          NUMBER OF PERSONS IN UNIT I WHEN UNIT I STARTS
          AN ENGAGEMENT AND WHEN UNIT I SENDS A TEMPORARY
          CASUALTY REPORT.  (1<=JU<=50)

CSLR     (J,JU)                                                 FIRALRT
          CSLR IS A HALF-WORD ARRAY OF 14 BY 100.
          FOURTEEN HALF WORDS (ONE PER EQUIP THAT EACH UNIT
          MAY HAVE) IS USED FOR EACH UNIT TO STORE THE TOTAL
          EQUIPMENT CASUALTIES INCURRED BY UNIT JU SINCE
          UNIT JU ENGAGES.  (1<=J<=7,1<=JU<=100)

DBDIFF                         SENSINP                          AURALINP
          THE MINIMUM DIFFERENCE (IN DB) BETWEEN BACKGROUND
          AND SOURCE NOISE LEVELS REQUIRED FOR AURAL DETEC-
          TION BY NORMAL HUMAN.
```

```
DBEQU    (IEQ,J)                    EQINP                        AURALIN
            NOISE LEVEL (IN DB) PRODUCED BY IEQ-TH  EQUIPMENT
            TYPE (1<=IEQ<=80):
             J=1  WHEN UNIT IS NOT MOVING.
             J=2  WHEN UNIT IS MOVING.

DCAS                                                             P
            NUMBER OF CASUALTIES INFLICTED BY WEAPON .

DECVAL  (ICHG)                      COSINP                       T
            THE ICHG-TH DATA VALUE WITH CHANGE-OF-STATE
            CRITERIA.  (1<=ICHG<=150)

DELMNT                              NAMELIST                     REVEQP
            A UNIT MUST HAVE CHANGED ITS RATE OF MOVEMENT AT
            LEAST DELMNT METERS DURING THE LAST MINUTE BEFORE
            A RATE OF MOVEMENT CHANGE ALERT WILL BE CONSIDERED.

DELMOVE                             NAMELIST                     REVEQP
            A UNIT MUST HAVE CHANGED ITS RATE OF MOVEMENT BY
            DELMOVE X 100 PERCENT BEFORE A RATE OF MOVEMENT
            CHANGE ALERT WILL BE CONSIDERED.

DELT                                SENSINP                      VISUSER
            ELAPSED TIME (TIME STEP)

DELXBS                                                           SKIP
            TERRAIN DATA GRID SQUARE X-DIMENSION IN METERS

DELYBS                                                           SKIP
            TERRAIN DATA GRID SQUARE Y-DIMENSION IN METERS

DENSITY (IVEG)                      NAMELIST                     TREEDTA
            NUMBER OF TREE TRUNKS PER SQUARE METER IN THE
```

```
              IVEG-TH (1<=IVEG<=16) VEGETATION CLASS

DERROR                                                      ADWDAT
              ORDNANCE DELIVERY BALLISTIC ERROR PERPENDICULAR TO
              THE DIRECTION OF FLIGHT OF THE AIR UNIT

DFMIRF                           NAMELIST                   VISIBLE
              GLOBAL MOVEMENT DEGRADATION FACTOR CAUSED BY OVERALL
              MICRO-RELIEF;  THIS FACTOR IS THE SAME THROUGHOUT
              THE AREA OF OPERATION.  0=NO DEGRADATION, 1=TOTAL
              IMMOBILITY.

DIAMTER (IVEG)                   NAMELIST                   TREEDTA
              DIAMETER OF TREE TRUNKS (METERS) IN THE IVEG-TH
              (1<=IVEG<=16) VEGETATION CLASS

DIESRAT (JU)                                                FUELRATE
              THE DIESEL FUEL CONSUMPTION RATE FOR UNIT JU IN
              GALLONS PER KM.  BASED ON EQUIPMENT REMAINING
              IN UNIT JU.  THIS VALUE IS RECALCULATED EVERY TIME
              STEP IN SUBROUTINE USEFUEL.  (1<=JU<=100)

DIES4KM (IEQ)                    EQINP                      EQFUEL
              AMOUNT OF DIESEL FUEL IN GALLONS THAT EQUIPMENT
              TYPE IEQ USES TO TRAVEL ONE KM (1<=IEQ<=80)

DIREAX  (JENG,J)                                            F
              DIRECTION OF THE JENG-TH ENGAGEMENT AXIS, BLUE TO
              RED.  STORED AS SIN (J=1), COS (J=2). (1<=JENG<=12)

DISMAX  (IUT)                    NAMELIST                   DISMX
              THE MAXIUM DISTANCE (IN METERS) FOR THE LINE OF
              SIGHT CALCULATION FOR UNIT TYPE IUT. (1<=JUT<=20)
```

```
DISMAXSQ(JUT)                                                          DISMX
                   THE MAXIMUM DISTANCE SQUARED(IN SQUARE METERS) FOR
                   THE LINE OF SIGHT CALCULATION FOR UNIT TYPE JUT.
                   (1<=JUT<=20)

DISPER   (IDF,J)                     WEFINP                            P
                   CONSTANTS FOR USE IN IN CALCULATING FRACTION OF
                   ROUNDS FALLING ON THE TARGET UNIT WHERE IDF IS THE
                   INDEX FROM IDISPR (1<=IDF<=10), 1<=J<=3 IS THE
                   NUMBER OF CONSTANTS USED.

DNU      (JU,J)                                                        BLEFT2
                   CASUALTIES FOR EQUIPMENT J IN UNIT JU
                   DURING CURRENT TIME STEP (1<=JU<=100,1<=J<=14)

DOMV                                                                   DATAB2
                   DOMINANT VEGETATION CLASS FOR THE ENTIRE MAP AREA

DPERS    (JU)                                                          BLEFT2
                   PERSONNEL CASUALTIES FOR UNIT JU DURING
                   CURRENT TIME STEP.  (1<=JU<=100)

DPERSU   (JU)                                                          BLEFT2
                   CASUALTIES FOR UNIT JU IF UNIT JU IS UNSUPRESSED
                   DURING CURRENT TIME STEP.  (1<=JU<=100)

DPMVT    (IOPG,J)                    OGINP                             G
                   DIRECTION FACED BY OPERATIONAL GROUPING - STORED
                   AS SIN (J=1) AND COS (J=2) - CARTESIAN COORDINATE
                   SYSTEM  (1<=IOPG<=20)

DTCTATPT(JAU)                                                          AIRDEFNS
                   = .TRUE. IF AIR UNIT WAS DETECTED AT POINT JAU.
                   (JAU IS INDEX TO /AIRLOC/ ARRAYS.) (1<=JAU<=8)
```

```
DTIME                                                                FORBLK
              FLOATING POINT EQUIVALENT OF IDTIME.

DTMTBFI (IEQ)                      NAMELIST                          MAINTATR
              THE NEGATIVE INVERSE OF THE MEAN TIME BETWEEN
              FAILURE IN MINUTES FOR GROUND EQUIPMENT TYPE
              IEQ (1<=IEQ<=80)

DUHTFAC                            SENSINP                           DISMOUNT
              THE VISUAL DETECTION FACTOR TO CHANGE THE UNIT
              EFFECTIVE HEIGHT WHEN THE UNIT IS DISMOUNTED.

DUWIFAC                            SENSINP                           DISMOUNT
              THE VISUAL DETECTION FACTOR TO THE UNIT
              EFFECTIVE WIDTH WHEN THE UNIT IS DISMOUNTED.

EFFDAT  (ICOEF,J)                  WEFINP                            P
              GROUPINGS OF FOUR CONSTANTS (J) TO BE USED WITH
              THE ICOEF-TH EFFECTS FUNCTIONS  (1<=ICOEF<=315)

EFFRAC                                                               P
              FRACTION OF ROUNDS FIRED AT TARGET AREA THAT FALL
              WITHIN THAT AREA.

ENGRFCTR(IOBST)                    NAMELIST                          ENGFACT
              ENGINEERING FACTOR (BETWEEN ZERO AND ONE INCLU-
              SIVELY)  USED TO REDUCE THE DELAY TIME ASSESSED
              AGAINST A UNIT STOPPED AT AN OBSTACLE OF TYPE
              IOBST (1<=IOBST<=10);  THIS FACTOR IS APPLIED ONLY
              IF ENGINEERING SUPPORT IS AVAILABLE TO THE
              DELAYED UNIT

ENTRYX                                                               DSTNTION
              X-COORD. OF THE POINT AT WHICH A UNIT WILL ENTER
```

```
             AN AREA OBSTACLE

ENTRYY                                                                       DSINTION
             Y-COORD. OF THE POINT AT WHICH A UNIT WILL ENTER
             AN AREA OBSTACLE

EQCAPAC (IEQ)                          EQINP                                 EQFUEL
             FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
             >= 0), FUEL CAPACITY IN GALLONS OF EQUIPMENT TYPE
             IEQ, INCLUDING SPARE CANS CARRIED
             FOR AIRCRAFT (IEQCOD(IEQ) = -1), FUEL CAPACITY OF
             AIRCRAFT (POUNDS)  (1<=IEQ<=80)

EQINIT  (IU,J)                         UNINP                                 BINIT
             INITIAL AMOUNT OF J-TH EQUIPMENT TYPE IN UNIT IU.
             (1<=IU<=100,1<=J<=14)

EQNAME  (J,IEQ)                        EQINP                                 NAMES
             12 CHARACTER NAME ASSOCIATED WITH
             EQUIPMENT TYPE IEQ (1-80)
                 J=1  FIRST FOUR CHARACTERS OF EQUIPMENT NAME
                 J=2  SECOND FOUR CHARACTERS OF EQUIPMENT NAME
                 J=3  THIRD FOUR CHARACTERS OF EQUIPMENT NAME

EQOVRD  (IEQ)                          NAMELIST                              EQUIP
             THE MAXIMUM DIAMETER IN METERS TREE TRUNKS IN
             A GIVEN VEGETATION CLASS THAT THE IEQ-TH
             (1<=IEQ<=80) EQUIPMENT TYPE CAN OVERRIDE

EQWDTH  (IEQ)                          NAMELIST                              EQUIP
             THE WIDTH IN METERS OF THE IEQ-TH (1<=IEQ<=80)
             EQUIPMENT TYPE.

EXITX                                                                        DSINTION
             X-COORD.  OF THE POINT AT WHICH A UNIT WILL EXIT
```

```
          AN AREA OBSTACLE

EXITY                                                                  DSTNTION
          Y-COORD. OF THE POINT AT WHICH A UNIT WILL EXIT
          AN AREA OBSTACLE

FCCON    (I)                     SENSINP                               VISUALIN
          THE I TH COEFFICIENT FOR THE FORMULA TO CALCULATE
          THE FRACTION OF A STATIONARY UNIT EXPOSED TO THE
          OBSERVER UNITS   (1<=I<=4)

FECFAC   (IOPG)                  OGINP                                 G
          FRONTAGE EXPANSION - CONTRACTION FACTOR FOR THE
          IOPG-TH OPERATIONAL GROUPING   (1<=IOPG<=20)

FIRE                                                                   P
          VOLUME OF FIRE (ROUNDS/UNIT TIME)

FIRED    (JU)                                                          AIRDEFNS
          = .TRUE. IF GROUND UNIT JU HAS ALREADY FIRED ITS AIR
          DEFENSE WEAPONS DURING CURRENT QUARTER MINUTE.
          (1<=JU<=100)

FIRFC                            SENSINP                               DUSER
          FACTOR BY WHICH FRACTION OF TARGET VISUALLY
          DETECTED IS REDUCED EACH TIME STEP IF LINE OF
          SIGHT IS LOST.

FPCON    (I)                     SENSINP                               VISUALIN
          THE I TH COEFFICIENT FOR THE FORMULA TO CALCULATE
          THE FRACTION OF A UNIT(IN PRONE POSITION) EXPOSED
          TO OTHER OBSERVER UNITS   (1<=I<=4)

FRACTG   (IU)                    UNINP                                 BLEFT2
```

```
                  FRACTION OF AREA OF UNIT IU THAT IS FIRED INTO WHEN
                  AREA FIRE IS EMPLOYED AGAINST UNIT IU (1<=IU<=100)

FREXOPST(IOPST)                 NAMELIST                         TARGETS
                  FRACTION OF TARGET UNIT WHICH WOULD NORMALLY BE
                  EXPOSED TO VIEW IF IT WERE OPERATING IN OPERATIONAL
                  STATE IOPST  (1<=IOPST<=95)

FRLKOPST(IU)                    NAMELIST                         NLOOK
                  THE FRACTION OF PEOPLE WHO ARE LOOKOUTS FOR UNIT IU
                  (1<=IU<=100)

FIMVMNT (JU)                                                     FOOTING
                  THE FRACTION OF TOTAL PERSONNEL IN UNIT JU WHO ARE
                  ON THEIR FEET.  (1<=JU<=100)
                    =0   IF THE WHOLE UNIT IS MOUNTED
                    =1.  IF THE UNIT IS DISMOUNTED COMPLETELY

GAF1                            NAMELIST                         GAFACTS
                  GROUND-AIR FACTOR 1.  FACTOR USED IN CALCULATING
                  PROBABILITY THAT AIR UNIT IS HIT BY GROUND SUPPORT
                  FIRE.

GAF2                                                             GAFACTS
                  GROUND-AIR FACTOR 2.  NOT USED.

GAF3                                                             GAFACTS
                  GROUND-AIR FACTOR 3.  NOT USED.

GAF4                                                             GAFACTS
                  GROUND-AIR FACTOR 4.  NOT USED.

GASRATE (JU)                                                     FUELRATE
                  THE GASOLINE CONSUMPTION RATE FOR UNIT JU IN GALLONS
```

```
                 PER KM. BASED ON TOTAL EQUIPMENT REMAINING IN UNIT
                 JU.  THIS VALUE IS RECALCULATED EVERY TIME STEP
                 IN SUBROUTINE USEFUEL.  (1<=JU<=100)

GAS4KM  (IEQ)                      EQINP                          EQFUEL
                 AMOUNT OF GAS IN GALLONS THAT EQUIPMENT TYPE IEQ USE
                 TO TRAVEL ONE KM  (1<=IEQ<=80)

H       (IVEG,I)                                                  DATAB1
                 HEIGHT IN METERS OF EACH OF THE 4 COMPONENTS OF
                 EACH OF THE 16 VEGETATION CLASSES (1<=IVEG<=16,
                 1<=I<=4)

HB      (N)                                                       VEGCOMP
                 HEIGHT OF VEG OBSTACLE BY TYPE.  NOT USED IN
                 CATTS.  1<=N<=9.

HLFRN   (IOPG)                     OGINP                          G
                 NORMAL HALF-FRONTAGE OF THE IOPG-TH OPERATIONAL
                 GROUP (1<=IOPG<=20)

HU      (IUT)                      UTINP                          VISUSER
                 THE EFFECTIVE HEIGHT (IN METERS) FOR THE TYPE IUT
                 UNIT FOR VISUAL DETECTION  (1<=IUT<=20)

HUN     (IUT)                      UTINP                          UNWDHD
                 HEIGHT IN METERS OF A SINGLE ELEMENT OF A
                 UNIT OF UNIT TYPE I - FOR LINE OF SIGHT
                 CALCULATIONS  (1<=IUT<=20)

I                                                                 DUMB
                 INDEX TO THE FIRING UNIT IN FIRING ROUTINES

IACPV   (JCKPT,JAU)                                               AIROUTES
```

```
            VELOCITY (IN METERS/MINUTE) AT JCKPT-TH CHECK POINT
            FOR AIR UNIT JAU  (1<=JCKPT<=9,1<=JAU<=10)


IACPX   (JCKPT,JAU)                                               AIROUTES
            X-COORDINATE OF JCKPT-TH CHECK POINT FOR AIR
            UNIT JAU.  (1<=JCKPT<=9,1<=JAU<=10).  CHECK POINTS
            ARE THE POINTS PUT IN USING THE AIR MENU.


IACPY   (JCKPT,JAU)                                               AIROUTES
            Y-COORDINATE OF JCKPT-TH CHECK POINT FOR AIR
            UNIT JAU.  (1<=JCKPT<=9,1<=JAU<=10).  CHECK POINTS
            ARE THE POINTS PUT IN USING THE AIR MENU.


IACPZ   (JCKPT,JAU)                                               AIROUTES
            Z-COORDINATE OF JCKPT-TH CHECK POINT FOR AIR
            UNIT JAU.  (1<=JCKPT<=9,1<=JAU<=10).  CHECK POINTS
            ARE THE POINTS PUT IN USING THE AIR MENU.


IADWUNIT(JU)                                                      WPNUMBR
            BIT FLAG INDICATING THAT A TARGET UNIT HAS BEEN HIT
            WITH AIR-DELIVERED ORDNANCE (JU=1,4)


IAEF                                                              P
            ALLOCATION CRITERION FOR AIMED FIRE VS EQUIPMENT.


IAGDET  (JU,JAU,JAS)                                              AIRDTECT
            BIT MATRIX INDICATING WHETHER GROUND UNIT IGU HAS
            ALREADY BEEN DETECTED BY AIR UNIT JAU WITH SENSOR
            JAS.  IGU IS USED TO DETERMINE JU.  (1<=JU<=4,
            1<=JAU<=10,1<=JAS<=6)


IAIRDFLG(JU)                                                      AIRDFLG
            AIR DEFENSE FLAG FOR GROUND UNIT JU.  =1, FIRE AT
            WILL;  =2, FIRE ONLY IF ATTACKED;  =3, DO NOT FIRE.
            (1<=JU<=100).
```

```
IAIRVUL (IUT)                          NAMELIST                          VULN2AIR
               AN INDICATOR DESCRIBING THE VULNERABILITY OF UNIT
               TYPE IUT TO AIR ORDNANCE   (1<=IUT<=20)
                  0=NOT USED
                  1=NOT ARMORED
                  2=LIGHT ARMORED
                  3=HEAVILY ARMORED

IAMMONAM(M,IAMMO)                      AMMOINP                           AMMONAM
               A 12 CHARACTER (M=1,3) NAME FOR EACH OF THE POSIBLE
               (IAMMO=1,60) AMMUNITION TYPES

IAMOALF (JU)                                                             REVEQP
               AMMUNITION REQUEST OUTSTANDING INDICATOR
               J-TH BIT (MOST SIGNIFICANT AS BIT 1):
               =0 J-TH UNIT DOES NOT HAVE A LOW AMMO REQUEST
                          OUTSTANDING
               =1 J-TH UNIT HAS A LOW AMMO REQUEST OUTSTANDING. IN
                          THIS CASE UNIT J WILL GENERATE NO
                          ADDITIONAL AMMO REQUESTS UNTIL UNIT IS
                          RESUPPLIED.
               (1<=JU<=4)

IAMOSIDE(IAMMO)                        AMMOINP                           EQSIDE
               A BYTE PACKED ARRAY (IAMMO=1,20) WHERE EACH BYTE
               CONTAINS A CODE CONTROLLING WHICH AMMUNITION TYPES
               WILL APPEAR ON THE MENUS WHEN THE RED OR
               BLUE C AND C BUTTON IS PUSHED.
                          0= BOTH ON RED AND BLUE
                          1= RED ONLY
                          2= BLUE ONLY
                          3= NEITHER RED OR BLUE (SPARE)

IAMT     (JTGT)                                                          PRINTFIR
               NUMBER OF ROUNDS FIRED AT THE JTGT-TH TARGET OF A
               GIVEN WEAPON.  (1<=JTGT<=50)
```

```
IAMTE    (IEQ,IMODE)                        EQINP                          A2
              (1<=IEQ<=80,1<=IMODE<=8)
              FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
              >= 0), AMMUNITION TYPE USED BY WEAPON TYPE IEQ IN
              MODE OF OPERATION IMODE (0 IMPLIES NO AMMUNITION
              USED).
              FOR AIRCRAFT (IEQCOD(IAC) = -1),
              IMODE = 1 TAKEOFF DELAY TIME FOR THIS AIRCRAFT
                          (IN MINUTES)
                      2 LANDING DELAY TIME FOR THIS AIRCRAFT
                          (IN MINUTES)
              FOR AIR ORDNANCE (IEQCOD(IAC) = -2),
              IMODE = 1 NUMBER OF AMMUNITION TYPE FOR THIS EQUIP-
                          MENT, IF ANY
                      2 NUMBER OF ROUNDS IN A STANDARD LOAD OF
                          THAT AMMUNITION TYPE.
                      3 RATE OF FIRE OF THIS EQUIPMENT
                          (ROUNDS/MINUTE)
                      4 NUMBER OF DROPS PER PASS
                          (APPLIES TO BOMBS)
                      5 DISTANCE BETWEEN DROPS (METERS)
                      6 DUD PROBABILITY TIMES 100
                      7 KILL PROBABILITY TIMES 100 FOR BRIDGE
                          TYPE 1.
                      8 KILL PROBABILITY TIMES 100 FOR BRIDGE
                          TYPE 2.

IAU                                                                        DUMB
              NUMBER OF AIR UNIT (NFDU <= IAU <= NLDU).

IBANDP   (IBDS,IBD)                         FSINP                          U
              FOR EACH BAND SET,THE ALLOCATION PRIORITY ASSIGNED
              TO EACH BAND. A ZERO VALUE OF IBANDP IMPLIES THAT
              BAND IS NOT USED IN ALLOCATION.  (IBDS=BAND SET,
              IBD= BAND NUMBER FOR WHICH PRIORITY IBANDP(IBDS,IBD)
              IS GIVEN (1<=IBDS<=9,1<=IBD<=4) .
```

```
IBANDX  (IBDS,IBD)                    FSINP                              S
                 THREE X-COORDINATES (IBD)--DEFINING TARGET BANDS ON
                 BATTLEFIELD (FOR GENERAL SUPPORT ALLOCATION , MODES
                 6 AND 8). THE BANDS OR REGIONS DEFINED (EXTENDING
                 TO X =- INFINITY   AND X=INFINITY   ON EACH END)
                 ARE SUBJECT TO DIFFERENT ALLOCATION FACTORS WITH
                 REGARD TO TARGETS LYING WITHIN  THEM . NINE OF SUCH
                 BAND(1<=IBDS<=9) SETS MAY BE DEFINED, WITH THE THREE
                 X-COORDINATES NECESSARY TO DESCRIBE THE FOUR BANDS.
                 (1<=IBD<=3)

IBDSET                                                                   U
                 NUMBER OF BAND SET TO BE USED IN A PARTICULAR CASE.

IBETA                                                                    P
                 WEAPON TYPE NUMBER (1-80).

IBEYOND (JU)                                                             PASSOBST
                 A PACKED ARRAY (HALF WORDS) CONTAINING THE FOLLOWING
                 DATA FOR THE JU-TH (1<=JU<=100) UNIT:
                     FIRST HALF WORD:   X-COORD. (DIVIDED BY FOUR) OF
                     DESTINATION POINT WHEN TRAVELING ACROSS AN AREA
                     OBSTACLE
                     SECOND HALF WORD:  Y-COORD. (DIVIDED BY FOUR) OF
                     DESTINATION POINT WHEN TRAVELING ACROSS AN AREA
                     OBSTACLE

IBFLAG                                NAMELIST                           ENGRWORK
                 FLAG INDICATING THAT AN OPERABLE BRIDGE IS NEARBY
                 AVAILABLE FOR USE WHEN CROSSING OVER AN OBSTACLE

IBFRNT  (JENG)                                                           F
                 HALF-FRONTAGE OF BLUE FORCE IN THE JENG-TH ENGAGE-
                 MENT.  (1<=JENG<=12)

IBRGSPAN(IBR)                         ROADINP                            BRIDGES
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```
                 NUMBER OF OBSTACLE WHICH BRIDGE IBR CROSSES
                 (1<=IBR<=16)

IBRGTYPE(IBR)                         ROADINP                        BRIDGES
                 TYPE OF BRIDGE (1<=IBR<=16)
                     1=METAL OR STONE
                     2=WOOD OR PONTOON

IBRGWDTH(IBRT)                        ROADINP                        BRIDGES
                 WIDTH (IN METERS) OF BRIDGE TYPE IBRT (1 OR 2)

IBRIDGEX(IBR,M)                       ROADINP                        BRIDGES
                 FIRST (M=1) AND SECOND (M=2) X COORD. OF BRIDGE IBR
                 (1<=IBR<=16)

IBRIDGEY(IBR,M)                       ROADINP                        BRIDGES
                 FIRST (M=1) AND SECOND (M=2) Y COORD. OF BRIDGE IBR
                 (1<=IBR<=16)

IBTASKS                               NAMELIST                       ENGRWORK
                 TOTAL NUMBER OF ENGINEERING TASKS CURRENTLY UNDERWAY
                 FOR THE BLUE ARMY

IBUILD                                NAMELIST                       ENGRWORK
                 FLAG INDICATING THAT A UNIT WILL BUILD A BRIDGE IN
                 ORDER TO GET ACROSS AN AREA OBSTACLE

ICL      (IVPOL)                                                     DATAVEG
                 VEGETATION CLASS FOR VEGETATION POLYGON IVPOL.
                 (1<=IVPOL<=225)

ICM      (J,ICM)                      CMINP                          CM
                  DEFINITION OF ICM-TH CONTROL MEASURE (1<=ICM<=100)
                      J=1  CODE WORD. ZERO MEANS MEASURE NOT IN USE.
```

```
OTHERWISE BYTE PACKED AS FOLLOWS:
  BYTE 0 = TYPE NUMBER OF THIS CONTROL
           MEASURE
           WHERE THE TYPES ARE AS FOLLOWS:
  LINES  1 = ASSAULT LINE
         2 = FIRE COORDINATION LINE
         3 = LINE OF CONTACT
         4 = LINE OF DEPARTURE
         5 = PHASE LINE
         6 = AIR CONTROL LINE
         7 = LIMIT OF ADVANCE
        11 = BOUNDARY LINE
             (SIZE MARK DEPENDS ON THE
             UNIT THAT THIS CONTROL
             MEASURE IS ASSIGNED TO.
             THE SIZE MARK WILL BE ONE
             LESS THAN THE SIZE, I.E. THE
             SIZE OF THE UNIT TO WHICH
             THIS CONTROL MEASURE IS
             ASSIGNED.  THUS BATTALIONS
             DETERMINE THE COMPANY
             BOUNDARIES, COMPANY SIZE
             UNITS DETERMIN PLATOON
             BOUNDARIES, ETC.)
        16 = DIRECTION OF ATTACK
        17 = ROUTE OF MARCH
        21 = NO FIRE LINE
        22 = PROBABLE LINE OF DEPLOYMENT
        28 = AXIS OF ADVANCE
        31 = DELAY LINE
        36 = FLIGHT ROUTE
        41 = MAIN SUPPLY ROUTE
  AREAS 51 = ASSEMBLY AREA
        52 = ATTACK POSITION
        53 = OBJECTIVE
        54 = DROP ZONE
        55 = LANDING ZONE
        56 = PICKUP ZONE
        57 = PATROL BASE
        58 = AREA OF OPERATIONS
        59 = ASSUMED ENEMY PENETRATION
        60 = TACTICAL AREA OF
```

```
              RESPONSIBILITY
          61 = FEBA OBJECTIVE
          62 = FIRE SUPPORT BASE
          63 = FLIGHT ROUTE CORRIDOR
          64 = AREA OF SUPPORT
          65 = SUPPLY DUMP
          71 = DEFENSE POSITION
               (SIZE MARK DEPENDS ON
               THE UNIT THAT THIS
               CONTROL MEASURE IS
               ASSIGNED TO).  ALSO, THE
               SIZE MARK WILL APPEAR 1/2 WAY
               BETWEEN THE FIRST POINT INPUT
               AND THE SECOND POINT INPUT.
          76 = NO FIRE AREA
          77 = RESTRICTED AREA
          81 = AIRCRAFT PATROL AREA
          86 = PROHIBITED FLYING AREA
          91 = VULNERABLE AREA
          96 = INNER ARTILLERY ZONE
          99 = AIRFIELDS
   POINTS 101 = CHECK POINT
          106 = COORDINATION POINT
          111 = RELEASE POINT
          112 = START POINT
          116 = PASSAGE POINT
          121 = PREPLANNED TARGET
     BYTE 1 = UNIT NUMBER TO WHICH MEASURE
              APPLIES. ALSO APPLIES TO ALL
              SUBORDINATE UNITS
     BYTE 2 = 0 MEANS RED AND BLUE MEASURE
              1 MEANS RED MEASURE
              2 MEANS BLUE MEASURE
     BYTE 3 = 0 MEANS MEASURE FOR DISPLAY
                PURPOSES ONLY
              NOTE:  IF ALERTS ARE NOT
              DESIRED, THE USER SHOULD
              PUT THE NUMBER 9 ON
              THE DATABASE (ANY NON
              ZERO NUMBER WILL DO).
              THE SUBROUTINE CONTMS WILL
              SET THIS BYTE TO THE VALUES
```

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                    SHOWN BELOW, BASED ON CONTROL
                    MEASURE TYPE AND ARRAY
                    MTYPOFCM.  THUS, CONTMS
                    CONVERTS THE DATABASE
                    INPUT NON ZERO VALUE TO
                    ZERO (DISPLAY ONLY = GENERATE
                    NO ALERTS) AND THE DATABASE
                    ZERO TO A NON ZERO (FROM
                    1 TO 168, AS SHOWN BELOW).
                    N.LT.64 MEANS GENERATE CONTROL
                      MEASURE ALERT TYPE N WHENEVER
                      A UNIT TO WHICH MEASURE
                      APPLIES MOVES ACROSS MEASURE.
                    N.GE.64 AND.LT.128 MEANS
                      GENERATE CONTROL MEASURE
                      ALERT TYPE (N MOD 64)
                      WHENEVER A UNIT TO
                      WHICH THE CONTROL MEASURE
                      APPLIES FIRES SUPPORT FIRE
                      WEAPONS ACROSS MEASURE.
                    N.GE.128 MEANS GENERATE CONTROL
                      MEASURE ALERT TYPE (N MOD 64)
                      WHENEVER UNIT TO WHICH
                      MEASURE APPLIES FIRES SUPPORT
                      FIRE WEAPONS SHORT OF MEASURE
                  NOTE THAT FIRING VIOLATIONS WILL
                  ONLY OCCUR WHEN A COMMAND AND
                  CONTROL FIRE COMMAND ORDERS FIRE
                  WHICH VIOLATES A CONTROL MEASURE.
J=2   MINIMUM X COORDINATE OF ANY POINT ON
      CONTROL MEASURE
J=3   MAXIMUM X COORDINATE OF ANY POINT ON
      CONTROL MEASURE
J=4   MINIMUM Y COORDINATE OF ANY POINT ON
      CONTROL MEASURE
J=5   MAXIMUM Y COORDINATE OF ANY POINT ON
      CONTROL MEASURE
J=6   WORDS DEFINING X,Y COORDINATES OF UP TO 8
TO    POINTS DEFINING CONTROL MEASURE. A VALUE
J=13  OF -1 MEANS THERE ARE NO MORE POINTS FOR
      THIS MEASURE. EACH WORD IS PACKED IN HALF
      WORDS AS FOLLOWS.
```

```
                    HW 0 + ICM(2,ICM) GIVES X COORDINATE OF
                           (J-5)TH POINT ON THIS MEASURE
                    HW 1 + ICM(4,ICM) GIVES Y COORDINATE OF
                           (J-5)TH POINT ON THIS MEASURE
                  NOTE THE FOLLOWING ASSUMPTIONS:
                    AREAS ALWAYS HAVE LAST POINT CONNECTED
                           TO FIRST POINT.
                    CONTROL POINTS ARE MODELED AS SMALL,
                           SQUARE CONTROL AREAS CENTERED AT
                           CONTROL POINT. COORDINATES OF
                           SQUARE ARE GIVEN AS ICM(6,ICM)
                           ICM(7,ICM),ICM(8,ICM),ICM(9,ICM).
                           THEN ICM(10,ICM)=-1 TO INDICATE
                           NO MORE POINTS. TRUE COORDINATES
                           OF POINT ARE GIVEN BY ICM(11,ICM)
                           AND ICM(12,ICM).
             J=14 EBCDIC REPRESENTATION OF THE 8 CHARACTER
             J=15 NAME ASSIGNED TO CONTROL MEASURE ICM

ICMBREAK(ICMT)                                                      CMNAME
             THE INDEX (USING THE BACKGROUND INDEXING SCHEME) OF
             THE CONTROL MEASURE TYPE WHICH MARKS THE BREAKPOINT
             BETWEEN CONTROL MEASURE CLASS ICMT AND CLASS ICMT+1
             (1<=ICMT<=6)

IDAYON                                                              WEATHR
             =0 IF NIGHT ; =1 IF DAY

IDBRAIN (IWC,J)                    SENSINP                          RAINDBFC
             J=1   IS THE GLOBAL WEATHER CLASS ASSOCIATED WITH
                   RAIN CLASS IWC.
             J=2   IS THE INCREMENTAL RAIN NOISE TO THE
                   BACKGROUND FOR RAIN CLASS IWC
             WHERE :  IWC = 1     LIGHT RAIN
                      IWC = 2     MODERATE RAIN
                      IWC = 3     HEAVY RAIN

IDCB10  (I,J)                                                       SCENARIO
```

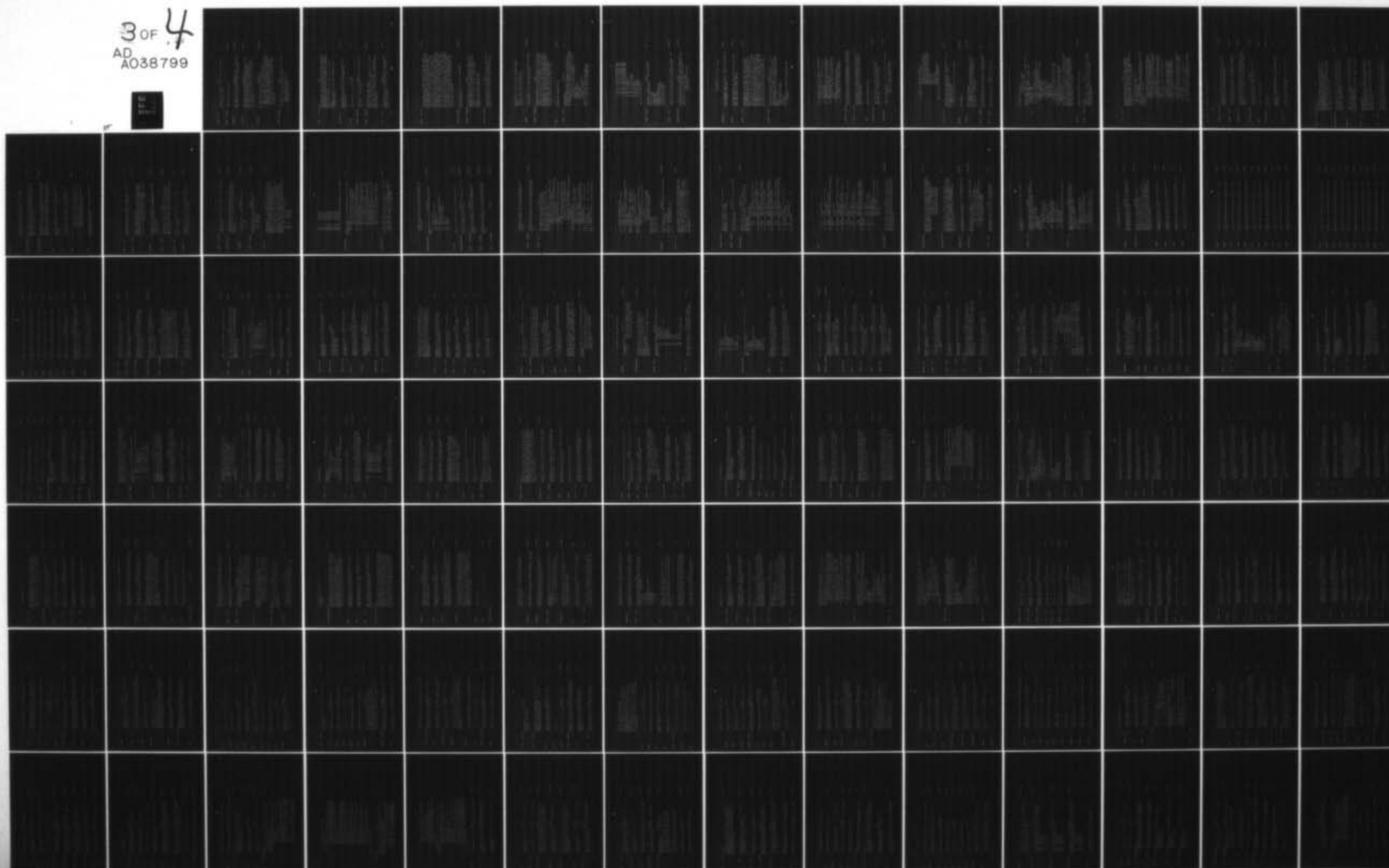
```
                FILE IDENTIFICATION FOR THE BINARY FILE OF THE DATA
                BASE ASSOCIATED WITH ONE OF THE TEN STANDARD
                SCENARIOS.  12 CHARACTERS, THE
                FIRST FOUR ARE A RIGHT JUSTIFIED DISK AREA NAME,
                FLLOWED BY AN EIGHT CHARACTER LEFT JUSTIFIED
                DISK FILE NAME.
                THE I-TH WORD OF THE DCB NAME FOR F:10 OF SCENARIO J
                (1<=I<=3,1<=J<=10)

IDCB11  (I,J)                                                        SCENARIO
                FILE IDENTIFICATION FOR THE PRESCHEDULED EVENTS FILE
                ASSOCIATED WITH ONE OF THE TEN STANDARD SCENARIOS.
                12 CHARACTERS, FIRST FOUR ARE A RIGHT JUSTIFIED DISK
                AREA NAME, FOLLOWED BY AN EIGHT CHARACTER LEFT
                JUSTIFIED DISK FILE NAME.
                THE I-TH WORD OF THE DCB NAME FOR F:11 OF SCENARIO J
                (1<=I<=3,1<=J<=10)

IDCB12  (I,J)                                                        DCB12
                FILE IDENTIFICATION FOR THE PREPLANNED MISSION FILE
                ASSOCIATED WITH ONE OF THE TEN STANDARD SCENARIOS.
                12 CHARACTERS, FIRST FOUR ARE A RIGHT JUSTIFIED DISK
                AREA NAME, FOLLOWED BY AN EIGHT CHARACTER LEFT
                JUSTIFIED DISK FILE NAME.
                I-TH WORD OF THE DCB NAME FOR F:12 FOR SCENARIO J
                (1<=I<=3,1<=J<=10)

IDEF                                                                 P
                NUMBER OF ENTRY IN EFFDAT TABLE.

IDEGRAD (JU)                                                         DEGRFTR
                BYTE PACKED ARRAY CONTAINING THE MOVEMENT DEGRAD-
                ATION FACTOR EXPRESSED AS AN INTEGER PERCENT APPLIED
                TO THE J-TH EQUIPMENT IN UNIT K
                THE FACTOR FOR THE J-TH (1<=J<=14) EQUIPMENT OF
                THE K-TH (1<=K<=100) UNIT IS STORED IN THE I-TH
                BYTE FROM IDEGRAD(1), WHERE
                I=(K-1)*14+J-1   (1<=JU<=350)
```

```
IDELAY   (IU)                        UNINP                                BLEFT2
              DELAY COUNTER (GENERAL PURPOSE) FOR UNIT IU.
              (1<=IU<=100)

IDESTX   (JU)                                                             OBST
              THE X-COORD. OF THE EXIT POINT OUT OF AN AREA
              OBSTACLE FOR THE JU-TH (1<=JU<=100) UNIT

IDESTY   (JU)                                                             OBST
              THE Y-COORD. OF THE EXIT POINT OUT OF AN AREA
              OBSTACLE FOR THE JU-TH (1<=JU<=100) UNIT

IDETA    (JU,J)                                                           DETECTC
              A BIT-PACKED ARRAY CONTAINING AURAL DETECTION
              VERDICTS.  UNIT J HAS A CURRENT DETECTION OF UNIT
              K IF THE K-TH BIT FROM IDETA(1,J) IS SET
              (1<=JU<=4,1<=J<=100)

IDETR    (JU,J)                                                           DETECTC
              A BIT-PACKED ARRAY CONTAINING GROUND RADAR
              DETECTION VERDICTS.  UNIT J HAS A CURRENT DETEC-
              TION OF UNIT K IF THE K-TH BIT FROM IDETA(1,J) IS
              SET  (1<=JU<=4,1<=J<=100)

IDETV    (JU,J)                                                           DETECTC
              A BIT-PACKED ARRAY CONTAINING VISUAL DETECTION
              VERDICTS.  UNIT J HAS A CURRENT DETECTION OF UNIT
              K IF THE K-TH BIT FROM IDETA(1,J) IS SET
              (1<=JU<=4,1<=J<=100)

IDIESF   (JU)                                                             REVEQP
              DIESEL RESUPPLY REQUEST OUTSTANDING INDICATOR.
              PLEASE SEE IAMDALF FOR INTERPRETATION (1<=JU<=4)
```

AD-A038 799 TRW DEFENSE AND SPACE SYSTEMS GROUP REDONDO REACH CALIF F/G 15/3
MATHEMATICAL MODEL USER'S MANUAL COMBINED ARMS TACTICAL TRAININ--ETC(U)
JAN 77 D S ADAMSON, E C ANDREANI, G W ARCHER N61339-73-C-0156

UNCLASSIFIED NAVTRAEQUIPC-73-C-0156-E00 NL

3 OF 4
AD
A038799



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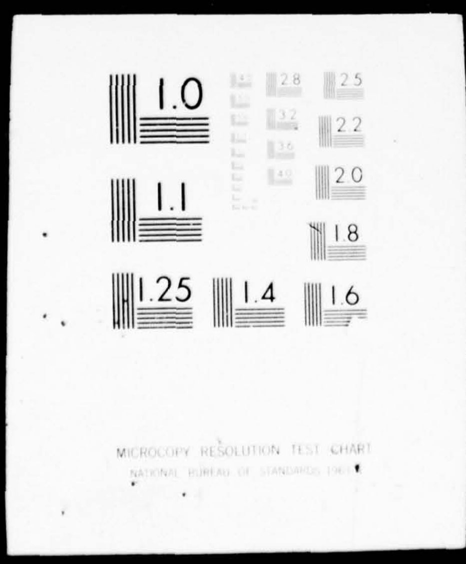
1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963

```
IDISPR   (IDF)                       WEFINP                          P
                WEAPON TYPE FOR WHICH EFFECT FUNCTION 6(FIRING)
                IS USED (1<=IDF<=10)

IDLIC    (I,J)                                                       UNDLIC
                ARRAY NOT CURRENTLY USED

IDMVLTST                             NAMELIST                        DISTMOVL
                THE MINIMUM DISTANCE (IN METERS) THAT A UNIT MUST
                MOVE BEFORE A NEW LINE OF SIGHT CALCULATION .

IDOSTART                             NAMELIST                        STARTIO
                THE NUMBER OF GAME MINUTES THAT WILL PASS BEFORE
                THE FIRST TIME THE OVERLAY CONTAINING THE
                ARMY STATUS REPORT WILL BE LOADED.  SINCE
                THE REPORT CANNOT BE PRODUCED WITHOUT LOADING
                THE OVERLAY, THIS VARIABLE SHOULD BE CONSISTENT
                WITH IOSTART.

IDOSTAT                              NAMELIST                        STATDATA
                =0 ARMY STATUS REPORT NOT REQUIRED.
                =N LOAD ARMY STATUS REPORT OVERLAY SEGMENT
                   EVERY N MINUTES AFTER FIRST TIME (SEE IDOSTART).
                   SINCE NO REPORT CAN BE PRINTED IF THE OVERLAY IS
                   NOT LOADED, THIS VARIABLE SHOULD BE SET TO THE
                   GREATEST COMMON DENOMINATOR OF THE INTERVALS
                   AT WHICH VARIOUS PORTIONS OF THE REPORT HAVE
                   BEEN REQUESTED VIA SETTINGS OF THE INPUT TABLE
                   IOINTRVL(I).

IDPCOD   (IOPG)                      OGINP                           G
                DEPLOYMENT CODE OF THE IOPG-TH OPERATIONAL GROUPING
                 IOPG=0-NOT DEPLOYED AND CANNOT MOVE
                      1-NOT DEPLOYED AND CAN MOVE
                      2-TECHNICALLY DEPLOYED
                      3-ACTUALLY DEPLOYED.
```

```
IDPRD    (IUT,ICOLOR)                  UTINP                          C
              FOR EACH UNIT TYPE IUT ,RED(ICOLOR=1),OR BLUE(ICOLOR
              =2), CODE THAT INDICATES WHICH RANGE TO USE WITH
              TARGET-ACQUISITION PROBABILITY CURVE TO DETERMINE
              ACQUISITION OF TARGETS FOR INDIRECT-FIRE WEAPONS IN
              UNIT   (1<=IUT<=20)
              0-IMPLIES DISTANCE FROM FIRING UNIT TO TARGET
              UNIT
              1-IMPLIES DISTANCE FROM LOCAL FRIENDLY FEBA
              TO TARGET UNIT.

IDSTMOVL(JU)                                                          DISTMOVL
              THE DISTANCE (IN METERS) THAT UNIT JU HAS MOVED
              SINCE THE LAST LINE OF SIGHT CALCULATION .
              (1<=JU<=100)

IDTIME                                 MISCVAR                        FORBLK
              TIME INCREMENT PER TIME STEP.

IDWENG   (IOPG)                        OGINP                          G
              DEPTH OF THE IOPG-TH OPERATIONAL GROUPING WHEN IT
              IS ENGAGED   (1<=IOPG<=20)

IECOD    (JEVT)                                                       EVINDT
              EVENT TYPE-SUBTYPE TABLE:
              JEVT-TH ENTRY CORRESPONDS TO JEVT-TH EVENT NOTICE
              STORED IN BACK-GROUND EVENT FILE.
              LEFT HALF WORD OF JEVT-TH ENTRY -- EVENT TYPE
              RIGHT HALF WORD OF JEVT-TH ENTRY -- EVENT SUBTYPE
              (1<=JEVT<=250)

IECTH    (IEQ)                         NAMELIST                       FIRATH
              NUMBER OF PIECES OF EQUIPMENT TYPE IEQ (1<=IEQ<=80)
              WHICH MAY BE LOST BY A UNIT BEFORE A CASUALTY
              ALERT IS GENERATED
```

```
IELEVE  (ITE,J)                                                  RELIEFE
          BUFFER AREA FOR READING ELEVATION DATA IN METERS
          FOR A GRID BLOCK. DATA IS BYTE PACKED FOR GRID CELLS
          OF DIMENSIONS DELXBS BY DELYBS. THE J-TH COLUMN OF
          THE ARRAY CONTAINS ELEVATION DATA FOR THE LINE
          X=(J-1)DELXBS + XZERO, WHERE XZERO IS THE X-COORD.
          OF THE ORIGIN OF THE TERRAIN DATA GRID BLOCK. THE
          FIRST HALF WORD IS A BASE ELEVATION IN METERS FOR
          THE COLUMN; THE SECOND HALFWORD IS 0 OR A POINTER TO
          A BLOCK IN THE TABLE IEVDSP USED FOR COL.ALONG WHICH
          THE ELEVATION CHANGES BY MORE THAN 255 METERS; THE
          NEXT 132 BYTES ARE INCREMENTS IN METERS TO BE ADDED
          TO THE BASE ELEVATION (+256 X DISPERSION FROM IEVDSP
          WHEN THE POINTER IS NONZERO)TO YIELD THE TOTAL ELEV.
          AT Y=(K-1)DELYBS + YZERO WHERE YZERO IS THE Y-COORD.
          OF THE ORIGIN OF THE TERRAIN DATA GRID BLOCK AND
          1 < K < 132.  K IS USED TO REFERENCE THE LAST 132
          BYTES OF THE WORDS INDICATED BY THE SUBSCRIPT ITE.
          (1<=ITE<=34,1<=J<=472)

IELEVO  (ITE,J)                                                  RELIEFO
          SAME AS IELEVE. IT IS USED TO FACILITATE
          ASYNCHRONOUS I/O.

IENDP1  (ICOLOR)                 FSINP                           F
          IN AN ENGAGEMENT, DEPTH OF REGION IN WHICH CLOSE-
          SUPPORT TARGETS MAY BE ASSIGNED. THIS DEPTH IS
          MEASURED EITHER FROM FRIENDLY FEBA OR ENEMY FEBA,
          DEPENDING UPON VALUE OF FIRE SUPPORT WEAPON
          CODE.
          ICOLOR=1 RED FIRING AGAINST BLUE
          ICOLOR=2 BLUE FIRING AGAINST RED.

IENDP2  (ICOLOR)                 FSINP                           F
          IN AN ENGAGEMENT, OUTER REGION IN WHICH INTERDICTORY
          FIRE TARGETS MAY BE ASSIGNED. THIS DEPTH IS
          MEASURED EITHER FROM FRIENDLY FEBA OR ENEMY FEBA,
```

```
                DEPENDING UPON VALUE OF FIRE SUPPORT WEAPON
                CODE.
                ICOLOR=1 RED FIRING AGAINST BLUE
                ICOLOR=2 BLUE FIRING AGAINST RED.

IENGR                                                          ENGUNIT
                TOTAL NUMBER OF ALL (RED AND BLUE) ACTIVE ENGINEER-
                ING SUPPORT UNITS AT THE CURRENT TIME

IENWID  (ICOLOR)                 FSINP                         F
                LATERAL DISTANCE (IN METERS) BEYOND THE HALF-WIDTH
                (IRFRNT OR IBFRNT) OF AN ENGAGEMENT IN WHICH INTER-
                DICTORY FIRE TARGETS MAY BE ASSIGNED. DEFINES THE
                LATERAL LIMITS OF THE REGION IN WHICH FIRE SUPPORT
                OF THIS TYPE IS CARRIED OUT. LATERAL LIMITS FOR
                CLOSE-SUPPORT FIRE ARE IRFRNT OR IBFRNT, WHICHEVER
                IS GREATER (TO EACH SIDE OF FEBA LOCATION):
                ICOLOR=1 EXTENSION FOR RED FIRING ON BLUE
                ICOLOR=2 EXTENSION FOR BLUE FIRING ON RED.

IEQ                                                            AEDUM
                NUMBER OF EQUIPMENT TYPE

IEQCLS  (IEQ)                    NAMELIST                      A3
                (1<=IEQ<=80)
                FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
                >= 0), FOR EACH GROUND EQUIPMENT TYPE IEQ, A GENERAL
                CLASSIFICATION FOR AIR ORDNANCE, DEFINED AS FOLLOWS:
                     0=NO CASUALTY EFFECT IS COMPUTED DUE TO AIR
                       ORDNANCE FOR GROUND EQUIPMENT.
                     1=SMALL ARMS
                     2=LIGHT MORTARS
                     3=ARTILLERY
                     4=NON-ARMORED VEHICLES
                     5=ARMORED VEHICLES
                FOR AIR ORDNANCE (IEQCOD(IEQ) = -2),
                IEQCLS = 1 IEQ IS A 250-LB LOW-DRAG BOMB
                         2 IEQ IS A 500-LB LOW-DRAG BOMB
```

```
                   3 IEQ IS A 750-LB LOW-DRAG BOMB
                   4 IEQ IS A 1000-LB LOW-DRAG BOMB
                   5 IEQ IS A 2000-LB LOW-DRAG BOMB
                   6 IEQ IS A 250-LB HIGH-DRAG BOMB
                   7 IEQ IS A 500-LB HIGH-DRAG BOMB
                   8 IEQ IS A 750-LB HIGH DRAG BOMB
                   9 IEQ IS MAVERICK
                  10 IEQ IS SHRIKE
                  11 IEQ IS 2.75 ROCKETS
                  12 IEQ IS 20-MM CANNON
                  13 IEQ IS CBU-2
                  14 IEQ IS CBU-24
                  15 IEQ IS ROCKEYE
                  16 IEQ IS NAPALM
          NOT USED FOR AIRCRAFT.

IEQCOD   (IEQ)                   EQINP                          A1
          EQUIPMENT CATEGORY CODE OF GIVEN EQUIPMENT
          TYPE IEQ (1<=IEQ<=80):
          -3-AIR SENSOR
          -2-AIR WEAPON
          -1-AIRCRAFT
          0-NOT A WEAPON
          1-DIRECT FIRE WEAPON
          2-INDIRECT FIRE WEAPON
          3-SUPPORT FIRE WEAPON.
          4-AIR DEFENSE WEAPON

IEQLM    (I)                                                    MSCLAN
          BEGIN (I=1) AND END (I=2) OF WEAPONS FUNCTION TABLE
          SEARCH (TABLE IS SORTED ON EQUIPMENT NUMBER)

IEQSIDE (IEQ)                    EQINP                          EQSIDE
          A BYTE PACKED ARRAY (IEQ=1,20) WHERE EACH BYTE I
          CONTAINS A CODE CONTROLLING WHETHER EQUIPMENT TYPE I
          WILL APPEAR ON THE MENUS WHEN THE RED OR
          BLUE C AND C BUTTON IS PUSHED.
                    0= BOTH ON RED AND BLUE
                    1= RED ONLY
```

```
                    2= BLUE ONLY
                    3= NEITHER RED OR BLUE (SPARE)


IEQURAFT                                                              RAFTS
            THE EQUIPMENT NUMBER (BETWEEN 1 AND 80) ASSIGNED TO
            THE EQUIPMENT TYPE RAFT


IEVCDN                                                                EVINDT
            EVENT TYPE-SUBTYPE OF EVENT THAT IS TO OCCUR NEXT
            LEFT HALF WORD -- EVENT TYPE
            RIGHT HALF WORD -- EVENT SUBTYPE


IEVDSP  (I,J)                                                         ELVDSP
            DISPERSION TABLE FOR USE WITH IELEVE OR IELEVO
            FOR COLUMNS OF A TERRAIN BLOCK FOR WHICH THE
            ELEVATION CHANGES BY MORE THAN 255 METERS. THE
            TABLE IS BYTE PACKED IN 12 BYTE BLOCKS. EACH
            BLOCK CONSISTS OF AT MOST SIX PAIRS OF ROW NUMBER
            AND NUMBER OF 256 METER INCREMENTS TO BE ADDED TO
            THE BASE ELEVATION IN IELEVE OR IELEVO FOR ALL
            ROWS EQUAL TO OR BEYOND THE ROW NUMBER. THE BLOCK
            OF BYTES IS TERMINATED BY A 0 BYTE WHEN FEWER THAN
            SIX PAIRS ARE REQUIRED.  J IS THE VALUE STORED IN
            THE SECOND HALF OF THE ELEMENT IELEVE(1,K) OR
            IELEVO(1,K), (1<=K<=472).  (1<=I<=3,1<=J<=750)


IEXTBL  (I,J)               MOVINP                                    R
            EXPANSION-CONTRACTION TABLE CONTAINING A SET OF
            CODE WORDS FOR MODIFYING FRONTAGES OF OPERA-
            TIONAL GROUPINGS ENTERING AN ENGAGEMENT TO MAKE
            THEM FIT FRIENDLY OR ENEMY ENGAGEMENT FRONTAGE,
            WHERE
             IEXTBL (I, 1) = UUVV
             IEXTBL (I, 2) = WXXYYZ
             (1<=I<=15)
            SUCH THAT
             UU = OPERATIONAL GROUPING NUMBER (00=> ANY
                  NUMBER),
```

```
            VV = CHARACTERISTIC UNIT TYPE OF OPERATIONAL
                 GROUPING (00=> ANY TYPE),
             W = RED GROUPING (1) OR BLUE GROUPING (2)
                 (0=> EITHER),
            XX = CHARACTERISTIC UNIT TYPE OF CONTROLLING
                 ENEMY OPERATIONAL GROUPING IN ENGAGE-
                 MENT (00=> ANY TYPE),
            YY = CHARACTERISTIC UNIT TYPE OF CONTROLLING
                 FRIENDLY OPERATIONAL GROUPING (00=> ANY
                 TYPE),
             Z = EXPANSION-CONTRACTION CODE:
                 1 => ADJUST TO FIT ENEMY FRONTAGE
                 2 => ADJUST TO FIT FRIENDLY FRONTAGE.

IFEBAB  (JENG,J)                                                  F
           THE X (J=1) AND Y (J=2) COORDINATES OF CENTER POINT
           OF BLUE FEBA IN THE JENG-TH ENGAGEMENT (1<=JENG<=12)

IFEBAR  (JENG,J)                                                  F
           THE X (J=1) AND Y (J=2) COORDINATES OF CENTER POINT
           OF RED FEBA (LOCATION OF CONTROLLING RED OG OR
           INTERSECTION OF RED FEBA WITH JENG-TH ENGAGEMENT
           AXIS)  (1<=JENG<=12)

IFEF                                                              P
           EFFECTS FUNCTION NUMBER.

IFIREFA (JU,J)                                                    FIREFAC
           THE PERCENTAGE OF UNIT K VISUALLY DETECTED BY
           UNIT JU, IS STORED IN THE K-TH BYTE FROM
           IFIREFA(JU,1)  (1<=JU<=100,1<=J<=25)

IFIROVRD(I)                                                       FIROVRD
           TABLE OF FIRE CONTROL EVENTS, HAVING THE FOLLOWING
           FORMAT (1<=I<=100):
                      BYTE 0 -- UNIT NUMBER (1-100)
                      BYTE 1 -- WEAPON NUMBER (1-80)
```

```
                 BYTE 2 -- DURATION (1-255)
             BITS 24-27 -- SUBEVENT TYPE (0-7)
                           0=PERCENT OF FIRE, SUPPRESSION
                           1=ROUNDS/MINUTE, SUPPRESSION
                           2=PERCENT OF FIRE,NO SUPRESSION
                           3=ROUNDS/MINUTE, NO SUPRESSION
                           4=NOT USED
                           5=NOT USED
                           6=NOT USED
                           7=CEASE FIRE
                           8=CANCEL FIRE MISSION
             BITS 28-31 -- NUMBER OF TARGETS

IFIRRFL (JU,J)                                                      BLEFT2
          INDICATORS OF FIRE RECEIVED(J=1) AND FIRE LAID ON
          (J=2) FOR UNIT JU (1<=JU<=100).  CODE:
          0 - DIRECT AND INDIRECT FIRE
          1 - INDIRECT FIRE ONLY
          2 - DIRECT FIRE ONLY
          3 - NO FIRE FROM DIRECT OR INDIRECT WEAPONS.

IFIRRL                                                              BLEFT2
          SEE IFIRRFL

IFIRSTME                                                            FIRSTIME
          FIRST TIME INDICATOR
          = 0  FORRAM NOT CALLED YET.(FORE-GRND NOT LOADED)
          = 1  FORRAM CALLED  (FORE-GRND INITIALIZED)
          NO RAMALERT OR PRINTO CALLS CAN BE ISSUED UNTIL
          FORE-GRND IS  INITIALIZED.

IFMUN    (JOPG)                                                     G
          FORWARD-MOST UNIT OF THE JOPG-TH OPERATIONAL GROUP-
          ING IN ITS DIRECTION OF MOVEMENT (1<=JOPG<=20)

IFNTB    (I,J)                      WEFINP                          P
          WEAPON EFFECTS LOOK-UP TABLE IS OF THE FORM
```

```
          SSXXYZZFADDD, WHERE
                      IFNTB(I,1) = SSXXYZZ
                      IFNTB(I,2) = FADDD
          I = I-TH (1<=I<=1000) ENTRY IN THE WEAPON EFFECTS
          LOOK UP TABLE SUCH THAT
            SS = OPERATIONAL STATE OF TARGET UNIT
              (00=> ANY STATE)
            XX = WEAPON TYPE
            Y = MODE OF FIRE (0=> ANY MODE)
            ZZ = TARGET PERSONNEL VULNERABILITY CLASS
                 (1 TO 6 - SEE VARIABLE NPFC)
              OR TARGET EQUIPMENT NUMBER (1 - 80) OR
                TARGET BRIDGE TYPE
                  91=BRIDGE TYPE 1
                  92=BRIDGE TYPE 2
                OR TARGET ROAD TYPE
                  95=ROAD TYPE 1
                  96=ROAD TYPE 2
                  97=ROAD TYPE 3
            F = WEAPON EFFECTS FUNCTION TO BE USED
            A = ALLOCATION CRITERION FOR AIMED FIRE
              VS EQUIPMENT
          DDD = NUMBER OF ASSOCIATED GROUPING OF
              CONSTANTS TO BE USED WITH EFFECTS
              FUNCTION (1-315).
          THIS TABLE MUST BE:  ALL ENTRIES AGAINST PERSONNEL
          FIRST, WITH ALL ARTILLERY VS PERSONNEL GROUPED
          AT THE END OF THE PERSONNEL ENTRIES, THEN ALL
          ENTRIES AGAINST EQUIPMENT, ROADS, AND BRIDGES,
          WITH ALL ANTI AIRCRAFT VS AIR EQUIPMENT AT THE
          END OF THE TABLE, IN A GROUP.


IFRFLG                                                          FIRALRT
          FIRING INDICATOR TABLE RESET FLAG


IFRNG   (IUT,J,ICOLOR)               UTINP                      C
          MAXIMUM RANGE AT WHICH A UNIT OF TYPE IUT AND COLOR
          ICOLOR(1 =RED, 2 =BLUE) CAN EMPLOY FIRE OF CATEGORY
          J(=KFICTR) AGAINST AN ENEMY UNIT IS IFRNG
          (1<=IUT<=20,1<=J<=2)
```

```
IFSTAB  (I,J)                    FSINP                          U
          I-TH (1<=I<=80) PAIR OF CODE WORDS IN THE FIRE
          SUPPORT ALLOCATION TABLE. THESE WORDS CONTROL
          ALLOCATION OF FIRE FOR SUPPORT UNITS OPERATING
          IN VARIOUS OPERATIONAL STATES. FIRST WORD IS OF THE
          FORM AABBCC, WHERE IFSTAB (I,1) = AABBCC
          SUCH THAT
              AA = SUPPORT FIRE WEAPON TYPE
              BB = WEAPON UNIT STATE
              CC = UNIT NUMBER.
              00 IN ANY POSITION INDICATES EQUALITY OF LOOK-UP
          SECOND WORD IS OF THE FORM TUVWXYZZ , WHERE
           IFSTAB(I,2) = TUVWXYZZ
          SUCH THAT
              T = 1 IF NUMBER GIVEN IN MODE DISTRIBUTION
                  VECTOR IS THE FRACTION OF TOTAL AVAILABLE
                  WEAPONS ALLOCATED TO TARGET CATEGORY
                = 2 IF NUMBER GIVEN IN THE VECTOR IS A TARGET
                  ELEMENT WEIGHTING FACTOR DUE TO IMPORTANCE
                  OF TARGET CATEGORY.
              U = 1 IF CLOSE-SUPPORT AND INTERDICTORY-FIRE
                  REGIONS ARE DEFINED RELATIVE TO FRIENDLY
                  FEBA
                = 2 IF REGIONS ARE DEFINED RELATIVE TO
                  ENEMY FEBA.
              V = 1 IF FIRE IN CLOSE SUPPORT REGION IS
                  DIRECTED AT INDIVIDUAL TARGET UNITS
                = 2 IF FIRE IN CLOSE SUPPORT REGION IS
                  DIRECTED UNIFORMLY AT WHOLE REGION.
              W = INDEX OF FIRE-SUPPORT TARGET BAND SET
                  TO USE (1-4)
              X = 1 IF BANDAL REPRESENTS FRACTION OF AVAILABLE
                  WEAPONS ALLOCATED TO BAND (MODES 6 AND 8)
                = 2 IF BANDAL REPRESENTS TARGET WEIGHTING
                  FOR BAND.
              Y = 1 IF GENERAL SUPPORT IS RESTRICTED TO
                  ASSIGNED FIRE-SUPPORT SECTOR
                = 2 IF GENERAL SUPPORT IS PERMITTED ANYWHERE.
             ZZ = NUMBER OF MODE DISTRIBUTION VECTOR TO USE.
```

```
IGADET   (JU,JAU)                                                    AIRDTECT
                 BIT MATRIX INDICATING WHETHER GROUND UNIT IGU HAS
                 ALREADY DETECTED AIR UNIT JAU.  IGU IS USED TO
                 DETERMINE JU.  (1<=JU<=4,1<=JAU<=10)

IGASF    (JU)                                                        REVEQP
                 GASOLINE RESUPPLY REQUEST OUTSTANDING INDICATOR
                 FOR INTERPRETATION PLEASE SEE IAMOALF (1<=JU<=4)

IGETTM   (I)                                                         TIMER
                 I=1 WORD 0 OF FPT(FUNCTION PARAMETER TABLE) TO GET
                 ELAPSED TIME(IN SECONDS)SINCE SYSTEM INITIALIZATION.
                 I=2 WORD 1 OF FPT USED TO STORE RETURNED ELAPSED
                 TIME.

IGRADSEN(IGSR)                      SENSINP                          RADARCOM
                 INDEX TO EQUIPMENT NUMBER FOR IGSR-TH GROUND
                 SURVEILLANCE RADAR  (1<=IGSR<=6)

IGU                                                                  DUMB
                 NUMBER OF GROUND UNIT.

IHITCH   (I)                                                         EQUIP
                 NOT USED

II                                                                   DUMB
                 NUMBER OF AIR UNIT (NFDU <= II <= NLDU). USED BY
                 ORDPRI AND AIREVENT; USED AS TGT UNIT BY FIRE
                 ROUTINES.

ILASTT   (I)                                                         ELTIMES
                 TIME AT WHICH COMPUTATIONAL LOOP I WAS ENTERED
                 SET IN TMSTRT  (1<=I<=30)
```

```
IMAXRE   (IEQ,ITGTE)                    EQINP                         A1
               (1<=IEQ<=80)
               FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
               >= 0), MAXIMUM FIRING RANGE (IN METERS) OF
               EACH WEAPON TYPE IEQ AGAINST PRIMARY (ITGTE=1),
               SECONDARY (ITGTE=2) TARGET ELEMENTS
               FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD
               (IEQ) = -2 OR -3), MAXIMUM RANGE AT WHICH EQUIP-
               MENT MAY BE USED (ITGTE = 1)

IMDEADCP (JU)                                                         CPDEAD
               THE SIMULATION TIME AT WHICH COMMUNICATIONS IS TO
               BE RESTORED TO UNIT JU, IF UNIT JU IS A C+C HQ
               WHICH HAS LOST COMMUNICATIONS BECAUSE IT HAS BEEN
               DESTROYED  (1<=JU<=100)

IMFIRING                                                              FIREMSR
               FLAG USED BY SUBROUTINE SPTALO TO INDICATE THAT A
               CALL TO SUBROUTINE CK4XING IS FROM A FIRING ROUTINE
               0 = NOT A SPTALO CALL
               1 = IS A SPTALO CALL
               AND THAT FIRING CONTROL MEASURES SHOULD BE CHECKED

IMINRE   (IEQ)                          EQINP                         MINRANGE
               (1<=IEQ<=80)
               FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
               >= 0), MINIMUM FIRING RANGE (IN METERS) FOR WEAPON
               (EQUIPMENT) TYPE IEQ
               FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD
               (IEQ) = -2 OR -3), MINIMUM RANGE AT WHICH EQUIP-
               MENT MAY BE USED

IMODE    (JTGT)                                                       PRINTFIR
               FOR SUPPORT FIRE WEAPONS, THE MODE OF FIRE(1 TO 8)
               USED AGAINST THE JTGT-TH TARGET OF A GIVEN SF
               WEAPON; FOR AIR DEFENSE WEAPONS, THE QUARTER MINUTE
               (1 TO 4) DURING WHICH THE JTGT-TH AIR UNIT WAS
```

```
                     FIRED AT BY A GIVEN AD WEAPON; (1<=JTGT<=50)
                     FOR OTHER WEAPONS, NOT USED.

IMPORD  (JMPF)                                                          UNIMXY
                     FOUR WORD ARRAY OF BIT FLAGS INDICATING IF FIRE AT
                     AN XY POINT JUST BEGAN, IN WHICH CASE AN ALERT IS
                     SENT; BIT POSITIONS CORRESPOND WITH IMPACTING FIRES
                     ARRAY IXYIM (1<=JMPF<=4)

IMPTEMP (JMPF)                                                          TEMPIMP
                     TEMPORARY STORAGE OF XY LOCATION FOR A FIRE COMMAND
                     AGAINST A SPECIFIC XY POINT(PACKED INTO HALF WORDS
                     LEFT HALF = X/4; RIGHT HALF = Y/4)
                     SUBSEQUENTLY PASSED TO THE FOREGROUND IN ANOTHER
                     ARRAY FOR DISPLAY OF IMPACTING FIRES (1<=JMPF<=100)

IMU                                                                     P
                     AN INDEX INDICATING NUMBER OF A MODE DISTRIBUTION
                     VECTOR (COMMUNICATION BETWEEN ORGFIR AND
                     SCHMU).

IMV                                                                     R
                     =1 ,UNIT NOT MOVING TOWARD A DISTINATION POINT
                     =2 ,UNIT IS MOVING TOWARD SPECIFIC POINT

IND                                                                     REMEV
                     = -1   DELETE EVENTS OF TYPE IT1 AND SUBTYPE IT2
                            OCCURING PRIOR TO OR AT TIME ITM
                     =  0   DELETE EVENTS OF TYPE IT1 AND SUBTYPE IT2
                            OCCURING AT TIME ITM
                     =  1   DELETE EVENTS OF TYPE IT1 AND SUBTYPE IT2
                            OCCURING AT OR AFTER TIME ITM

IND                                                                     FIRORG
                     INDICATOR FOR FIRE CONTROL COMMANDS (1=PERCENT OF
                     FIRE, 2=ROUNDS/MINUTE)
```

```
INENT    (I)                                                    ELTIMES
              NUMBER OF TIMES THAT COMPUTATIONAL LOOP I WAS EN-
              TERED USED IN SYSTEM TIMING  (1<=I<=30)

INEVNT   (JEVT)                                                 EVINDT
              EVENT INDICATOR TABLE:
              JEVT-TH ENTRY CORRESPOND TO JEVT-TH EVENT NOTICE
              STORED IN BACK-GROUND EVENT FILE. (1<=JEVT<=250)
              LEFT HALF WORD OF JEVT-TH ENTRY -- TIME AT WHICH
                             JEVT-TH EVENT IS TO OCCUR.
              RIGHT HALF WORD OF JEVT-TH ENTRY -- ENTRY NUMBER OF
                             SUCCEEDING EVENT TO OCCUR.

INITFLG                                                         FLGINIT
              A FLAG TO TELL SUBROUTINES SETOGCDS,OGLOC,TASKORG,
              MANEUVER IF INITIALIZATION IS COMPLETE
               0= NOT COMPLETE
               1= COMPLETED

INOG     (IU)                   UNINP                           BLEFT1
              OPERATIONAL GROUPING TO WHICH UNIT IU BELONGS.
              (IF 0, UNIT IU DOES NOT BELONG TO ANY OP. GROUP)
              IF IU IS AN AIR UNIT, INOG = 1 IS A RED AIR
              UNIT AND INOG = 2 IS A BLUE AIR UNIT. (1<=IU<=100)

INTRVL   (I)                                                    STOPC
              ARRAY IS INITIALIZED BY INPUT BUT ITS VALUE IS NOT
              USED.  (1<=I<=4)

INTSAVE                                                         WORDS
              RESTART INTERVAL AT WHICH AVAILABLE.  THREE
              ADDITIONAL BLOCKS OF COMMON BLOCK DATA ARE STORED
              ON F:20 EVERY RESTART INTERVAL.
```

```
INVDT    (JEVT)                                                        EVINDT
               EVENT NOTICE DATA OF EVENT THAT IS BEING PROCESSED.
               (1<=JEVT<=64)

IOBALRT (JU)                                                           OBALRT
               A BIT ARRAY USED TO COMMUNICATE TO SUBROUTINE
               LOWALRT WHETHER OR NOT AN OBSTACLE ALERT SHOULD BE
               GENERATED FOR A UNIT DURING THE CURRENT TIME STEP
               (1<=JU<=4)

IOBONOFF                              NAMELIST                         OBSONOFF
               FLAG WHICH TURNS OBSTACLE MODULE ON OR OFF
                  = 0   ON
                  = 1   OFF

IOBRB    (IOBS)                       OBFMINP                          OBSDATA
               CODE DESIGNATING WHICH ARMY THE IOBS-TH
               (1<=IOBS<=50) OBSTACLE BELONGS TO:
                  = 0   EITHER ARMY
                  = 1   RED ARMY
                  = 2   BLUE ARMY

IOBSFLAG                              NAMELIST                         OBSONOFF
               FLAG WHICH WILL TURN OBSTACLE DIAGNOSTIC PRINT
               STATEMENTS ON.  THE VALUE OF THE FLAG DEPENDS ON
               WHICH OF THE SIXTEEN SUBROUTINES IN THE OBSTACLE
               MODULE IS TO YIELD DIAGNOSTIC OUTPUT.  EACH
               SUBROUTINE HAS A BIT POSITION ASSOCIATED WITH IT IN
               THE WORD IOBSFLAG.  WHEN A GIVEN BIT POSITION IS
               TURNED ON (I.E. SET TO ONE), THE CORRESPONDING
               SUBROUTINE WILL YIELD DIAGNOSTIC OUTPUT DURING
               EXECUTION.  THUS THE VALUE OF THIS FLAG WILL BE
               GIVEN BY THE DECIMAL INTEGER RESULTING FROM WHETHER
               THE FOLLOWING BITS ARE SET TO ONE:
                  BIT  1 (LOW ORDER)  BRCHPATH
                  BIT  2     BULDBRDG
                  BIT  3     ENGRSPT
                  BIT  4     ENGRUNIT
```

```
          BIT  5     ENGUPDAT
          BIT  6     FINDBRDG
          BIT  7     LINESEG
          BIT  8     MINEFLDS
          BIT  9     NEAROBS
          BIT 10     NGTVPSTV
          BIT 11     OBSCHECK
          BIT 12     OBSDELAY
          BIT 13     OBSTACLE
          BIT 14     OBSUPDAT
          BIT 15     OBSWIDTH
          BIT 16     SAVEOLD
          BITS 17 TO 32 CURRENTLY NOT USED (SET TO ZEROS)


IOBSTATU(JU)                                                        OBST
        STATUS OF THE JU-TH (1<=JU<=100) UNIT WITH RESPECT
        TO OBSTACLES:
          = 0  UNIT IS NOT STOPPED BY AN OBSTACLE
          = 1  UNIT IS STOPPED AT AN OBSTACLE, AND
               ENGINEERING SUPPORT IS AVAILABLE
          = 2  UNIT IS TRAVERSING THROUGH AN OBSTACLE
          = 3  UNIT IS STOPPED AT AN OBSTACLE WAITING FOR
               ENGINEERING SUPPORT
          = 4  UNIT IS STOPPED BY AN OBSTACLE REQUIRING
               THE CONSTRUCTION OF A BRIDGE WITHOUT THE
               AID OF ENGINEERING SUPPORT
          = 5  UNIT IS STOPPED BY AN OBSTACLE REQUIRING
               THE CONSTRUCTION OF A BRIDGE WITH THE AID
               OF ENGINEERING SUPPORT
               THE CONSTRUCTION OF A BRIDGE WITH THE AID
               OF ENGINEERING SUPPORT
          = 6  UNIT IS STOPPED TEMPORARILY IN ORDER TO
               PREPARE FOR A BRIDGE CROSSING OPERATION


IOBSTOP (JU)                                                        OBST
        A PACKED ARRAY (HALF WORDS) CONTAINING THE FOLLOWING
        DATA FOR THE JU-TH (1<=JU<=100) UNIT:
          FIRST HALF WORD:   A FLAG INDICATING WHETHER THE
          JU-TH UNIT HAS ARRIVED AT A DESIGNATED POINT
          BEYOND AN AREA OBSTACLE  (0=NO,1=YES)
```

```
                SECOND HALF WORD:  THE INTEGER DESIGNATION OF
                THE OBSTACLE (1 THRU 50) CURRENTLY DELAYING THE
                JU-TH UNIT

IOBSTYPE(IOBS)                 OBFMINP                      OBSDATA
            THE TYPE OF THE IOBS-TH (1<=IOBS<=50) OBSTACLE
            WHERE:
                = 1   CRATER FIELD
                = 2   GENERAL MASS OBSTACLE
                = 3   MINEFIELD
                = 4   LAKE
                = 5   WATERWAY (CANAL,RIVER,ETC.)
                = 6   CONCERTINA BARRIER
                = 7   FIXED WALL (BARRIER)
                = 8   DITCH
                = 9   RAVINE
                =10   CLIFF

IOBSWIDE                                                    OBSTDIST
            WIDTH (IN METERS) ACROSS A PARTICULAR OBSTACLE

IOBWIDTH(IOBS)                 OBFMINP                      OBSDATA
            THE WIDTH (WHEN APPLICABLE) (IN METERS) ACROSS THE
            IOBS-TH (1<=IOBS<=50) OBSTACLE

IOBX     (I,IOBS)              OBFMINP                      OBSDATA
            X COORD. OF ENDPOINT OF THE I-TH (1<=I<=6) LINE
            SEGMENT DESCRIBING THE IOBS-TH (1<=IOBS<=50)
            OBSTACLE

IOBXX    (JLSG)                                             BANDOBS
            X COORD. OF ENDPOINT OF THE JLSG-TH (1<=JLSG<=12)
            LINE SEGMENT DESCRIBING A GIVEN LINEAR BAND OBS-
            TACLE

IOBY     (I,IOBS)              OBFMINP                      OBSDATA
```

```
                  Y COORD. OF ENDPOINT OF THE I-TH (1<=I<=6) LINE
                  SEGMENT DESCRIBING THE IOBS-TH (1<=IOBS<=50)
                  OBSTACLE

IOBYY    (JLSG)                                                      BANDOBS
                  Y COORD. OF ENDPOINT OF THE JLSG-TH (1<=JLSG<=12)
                  LINE SEGMENT DESCRIBING A GIVEN LINEAR BAND OBS-
                  TACLE

IOCOD    (I)                        MISCVAR                          E
                  I-TH DEBUG OUTPUT CONTROL (1<=I<=20)
                  = 0 MEANS DO NOT PRINT DEBUG PRINTOUT.
                  NOT = 0 MEANS TURN DEBUG PRINTOUT ON.
                  EXCEPTIONS AND NON PRINT CONTROL ENTRIES ARE
                  SPECIFICALLY NOTED BELOW.
                  ( 1) = CHGCRT DEBUG, BUT NOT EQUAL 1 MEANS DO NOT
                         PRINT, AND = 1 MEANS DO PRINT.
                  ( 2) = ADD2LIST,FIXLIST,FIXOGCDS,FRNTGS,NEWFWDUN,
                         OGHFRONT,OGTYPE,SETOGCDS,TASKORG DEBUG PRINT.
                         TASKING ORGANIZATION.
                  ( 3) = CHRCRT AND FSTOT FORCE RATIO CALCULATION
                         CONTROL.
                         = 0 FORCE RATIO DOES NOT INCLUDE SUPPORT
                             FIRE (IEQCOD=3) WEAPONS (I.E., UNITS
                             LOCATED IN THE LOCAL REGION OF BATTLE
                             ARE THE ONLY ONES INCLUDED.)
                         = 1 FORCE RATIO INCLUDES SUPPORT FIRE WEAPONS
                             (IEQCOD=3).
                  ( 4) = FWDLIN DEBUG PRINT.
                  ( 5) = CHGCRT,CHGOPN DEBUG PRINT.  CHANGE OF
                         OPERATIONAL STATE VIA TABLE DRIVEN
                         COMMAND AND CONTROL.
                  ( 6) = AMOVUL,FIRALO,ORGFIR,STEP,WPNFIR,WTSUB
                         DEBUG PRINT.  FIRING (USES LOTS OF LINE
                         PRINTERRPAPER).
                  ( 7) = WPNFIR DEBUG PRINT.  CASUALTY REPORTS.
                  ( 8) = NOT USED.
                  ( 9) = GENFIR,SPTALO DEBUG PRINT.  SUPPORT FIRE
                         FIRING REPORTS.
                  (10) = WPNEFF DEBUG PRINT.  PERSONNEL CASUALTIES
```

```
                DUE TO EQUIPMENT LOSSES.
          (11) = NEWMOV DEBUG PRINT. TABLE DRIVEN
                 COMMAND AND CONTROL.
          (12) = ARRIVE, MANEUVER, OG2UNI, REL2FWDU, WTHDRW,
                 DEBUG PRINT.  MOVEMENT AND ARRIVAL AT
                 DESTINATIONS.
          (13) = NEWENG DEBUG PRINT.  ENGAGEMENTS.
          (14) = STLKUP DEBUG PRINT.  TABLE DRIVEN
                 CHANGE OF OPERATIONAL STATE DUE TO
                 AUTOMATIC MOVEMENT CODE CHANGE.
          (15) = NOT USED.
          (16) = CHGCRT, FSTOT, AND WPNFIR FORCE RATIO
                 CALCULATION CONTROL.
                  = 0 ONLY INCLUDE SUPPORT FIRE WEAPONS
                      (IEQCOD=3)
                  = 1 INCLUDE SUPPORT FIRE WEAPONS
                      (IEQCOD=3) AND ALSO INDIRECT
                      FIRE WEAPONS (IEQCOD=2).
          (17) = NOT USED
          (18) = NOT USED
          (19) = NOT USED
          (20) = NOT USED

IODEGR                      NAMELIST                        PRINTERR
          FLAG CONTROLLING MOVEMENT DEGRADATION DIAGNOSTIC AND
          DEBUG OUTPUT WHERE:
          = 0        NO OUTPUT
          = 1 OR 2   PARTIAL OUTPUT
          = 3        ALL AVAILABLE OUTPUT

IOGCDS  (JU,J)                                              BLEFT1
          IS THE PLANNED LOCATION (DISTANCE FROM FORWARD MOST
          UNIT IN METERS) TO THE LOCATION OF THE FOWARD MOST
          UNIT OF ITS OP GROUP WHEN THE OPERATIONAL
          GROUPING IS DEPLOYED. J=1 IS THE FORWARD DISTANCE
          OF UNIT FROM THE LOCATION OF THE FORWARD MOST UNIT
          (NEGATIVE IS REARWARD) : J=2 IS THE LATERAL DISTANCE
          FROM THIS LOCATION (PLUS IS TO THE LEFT)
          (1<=JU<=100)
```

```
IOGSTAT (JOPG)                                                                    OBSTAT
                STATUS OF OPERATIONAL GROUP JOPG (JOPG=1,20)
                IOGSTAT=0  NORMAL OP GROUP
                IOGSTAT=-1 DEFUNCT OP GROUP

IOGTYP  (IOPG)                         OG'NP                                      G
                CHARACTERISTIC UNIT TYPE FOR THE IOPG-TH OPERATION
                GP.  (1<=IOPG<=20)

IOINTRVL(I)                            NAMELIST                                   IOFLAGS
                STATUS REPORT AND DEBUG PRINT CONTROL
                (WHEN COORDINATED WITH VARIABLES IOSTART(I),
                IODSTAT, AND IODSTART.  SEE SECT 5.7.5 OF THE
                USERS MANUAL.)
                I=1  UNIT STATUS REPORT
                     = 0        DO NOT PRINT
                     = N>0      PRINT TRW VERSION EVERY N MINUTES
                     = N<0      PRINT ARMY VERSION EVERY -N
                                MINUTES (-15 MEANS EVERY 15 MINUTES)
                I=2  UNIT EQUIPMENT LEVEL REPORT CONTROL
                     = 0        DO NOT PRINT
                     = N>0      PRINT TRW VERSION EVERY N MINUTES
                     = N<0      PRINT ARMY VERSION EVERY -N MINUTES
                I=3  UNIT AMMUNITION LEVEL REPORT CONTROL
                     = 0        DO NOT PRINT
                     = N>0      PRINT TRW VERSION EVERY N MINUTES
                     = N<0      PRINT ARMY VERSION EVERY -N MINUTES
                I=4  UNIT PERSONNEL LEVEL REPORT CONTROL
                     = 0        DO NOT PRINT
                     = N>0      PRINT TRW VERSION EVERY N MINUTES
                     = N<0      PRINT ARMY VERSION EVERY -N MINUTES
                I=5  BAD DIRECTION DEBUG PRINT CONTROL.(PDIR ERROR)
                     = 0        DO NOT PRINT
                     = 1        PRINT
                I=6  EQUIPMENT MANNING DEBUG PRINT CONTROL
                     (SUBROUTINE REDIST)
                     =0         DEBUG PRINT OFF
                     =1         DEBUG PRINT ON
                I=7  FIRE REPORT
```

```
           = 0         DO NOT PRINT
           = 1         PRINT
     I=8   DETECTION MODULE DEBUG PRINT CONTROL
           = 0         DO NOT PRINT
           = N>0       PRINT EVERY N MINUTES
     I=9   RADAR DETECTION DEBUG PRINT CONTROL.(SUBROUTINE
           RADAR)
           = 0         DO NOT PRINT
           = 1         PRINT
     I=10  CASUALTIES ALERT MESSAGES DEBUG PRINT CONTROL
           = 0         DO NOT PRINT
           = N>0       PRINT EVERY N MINUTES
     I=11  MOVEMENT DEGRADATION DEBUG PRINT CONTROL
           = 0         DO NOT PRINT
           = N>0       PRINT EVERY N MINUTES
     I=12   UNIT ELEVATION, SLOPE, SOIL AND VEGETATION
            PRINT CONTROL
           = 0         DO NOT PRINT
           = N>0       PRINT EVERY N MINUTES
     I=13  UNIT FUEL LEVEL REPORT PRINT CONTROL.
           = 0         DO NOT PRINT
           = N>0       PRINT TRW VERSION EVERY N MINUTES
           = N<0       PRINT ARMY VERSION EVERY -N MINUTES
     I=14  LINE OF SIGHT AND TARGET ACQUISITION PRINT
           CONTROL.
           = 0         DO NOT PRINT
           = N>0       PRINT EVERY N MINUTES
     I=15  EVENT NOTICE DEBUG PRINT CONTROL.
           = 0         DO NOT PRINT
           = 1 TO 5    PRINT WHEN OCCURS
           > 5         PRINT WHEN RECEIVED FROM FOREGROUND
                       PLUS WHEN OCCURS
           > 9         SAME AS > 5 PLUS SOME EVENTS DEBUG
                       PRINTOUT.

IOLDDATA(JU)                                                  OLDMVDTA
     HALFWORD PACKED ARRAY CONTAINING MOVEMENT DATA FOR
     THE JU-TH (1<=JU<=100) UNIT WHERE THE FIRST HALF
     WORD STORES THE OPERATIONAL STATE OF THE JU-TH UNIT
     AND THE SECOND HALF WORD STORES THE MOVEMENT CODE
     OF THE JU-TH UNIT
```

```
IOLDMVDT(J,JU)                                                SAVEMVDT
          AN ARRAY USED TO SAVE THE OLD MOVEMENT DATA VALUES
          FOR UNIT JU IF IT BECOMES ENGAGED.  THESE VALUES MAY
          THEN BE RESTORED AT THE TERMINATION OF THE ENGAGE-
          MENT, ALLOWING UNIT THEN TO CONTINUE AS BEFORE.
                    IOLDMVDT(1,JU) = MVTCD(JU)
                    IOLDMVDT(2,JU) = MVDT1(JU)
                    IOLDMVDT(3,JU) = MVDT2(JU)
                    IOLDMVDT(4,JU) = MVDT3(JU)

IONBOARD(IRAFT)                                               RAFTS
          BYTE PACKED ARRAY STORING THE NUMBER OF THE
          ENGINEERING UNIT THAT WILL PROVIDE A RAFT FOR THE
          K-TH (1<=K<=100) UNIT AND WILL ALSO ESCORT THE K-TH
          UNIT THROUGH A GIVEN WATER OBSTACLE WHERE K IS THE
          K-TH BYTE FROM IONBOARD(1).  (1<=IRAFT<=25)
          THIS WAS DONE FOR TEST PURPOSES, AND PROBABLY
          SHOULD NOT BE USED.

IONROAD (JU)                                                  ONROAD
          FLAG INDICATING WHETHER THE JU-TH (1<=JU<=100) UNIT
          IS TRAVELING ALONG A ROAD

IOPSTATE(JJ)                                                  DEPLOYOG
          USED TO SET THE OP STATE OF AN OP GROUP DEPLOYING
          UNDER TASKING ORGANIZATION
             JJ=1=OP STATE 11 MOVING TO CONTACT
                (FOR OGS DEPLOYING ENGAGED-MTCDOG=3)
             JJ=2=OP STATE 86 DISPLACING RESERVE
                (FOR OGS DEPLOYING UNENGAGED-MTCDOG=15)
             JJ=3=OP STATE 22 HASTY DEFENSE
                (FOR HALTED OGS-MTCDOG=7)

IOPSTU  (IU)                    UNINP                         BSTAT
          OPERATIONAL STATE OF UNIT IU.  IF IU IS AN AIR
          UNIT, IOPSTU = 1 IF IU IS ON A RECONNAISSANCE
```

```
            MISSION AND = 2 IF IU IS ON A STRIKE MISSION.
            (1<=IU<=100)

IOPTB1  (I,J)                   COSINP                             T
            CHANGE-OF-STATE SELECTION TABLE FOR USE IN
            CHANGING OPERATIONAL STATE OF UNIT. EACH ENTRY I
            IS OF THE FROM UUVVWXXYYZZ, WHERE
              IOPTB1 (I,1) =UUVVW
              IOPTB1 (I,2) = XXYYZZ
              (1<=I<=220)
            SUCH THAT
              UU = UNIT TYPE
              VV = OPERATIONAL GROUPING
                   NUMBER OF UNIT (99=>
                   ANY UNIT NOT IN A
                   GROUPING)
               W = 1 OR 2 (RED OR BLUE)
              XX = MOVEMENT CODE OF UNIT
                   (88=> ANY NONENGAGED
                   CODE (5-16))
              YY = PRESENT OPERATIONAL
                   STATE OF UNIT
              ZZ = UNIT NUMBER.
              0 IN ANY POSITION MEANS EQUALITY OF LOOK-UP

IOPTB2  (I)                     COSINP                             T
            TABLE OF CODE WORDS ASSOCIATED WITH WORDS IN
            CHANGE-OF-STATE SELECTION TABLE. EACH ENTRY I
            IS OF THE FORM AABBBCCD, WHERE
             IOPTB2 (I) = AABBBCCD
              (1<=I<=220)
            SUCH THAT
             AA = NUMBER OF CHANGE-OF-STATE
                  CRITERION TO BE USED
            BBB = LINE NUMBER OF DATA VALUE IN
                  DECVAL TABLE TO BE USED WITH
                  CRITERION
             CC = NEW OPERATIONAL STATE OF UNIT
                  IF CRITERION IS SATISFIED
              D = 1 IF UNIT LEAVES ITS OPERATIONAL
```

```
              GROUPING WHEN IT CHANGES STATE,
             = 0 IF IT DOES NOT.

IOPTST                           NAMELIST                          DISMX
           THE LARGEST NUMERICAL VALUE ANY UNIT MAY HAVE FOR
           ITS OPERATIONAL STATE AND STILL BE ELIGIBLE FOR
           LINE OF SIGHT CALCULATIONS

IOSTART (I)                      NAMELIST                          STARTIO
           THE NUMBER OF GAME MINUTES THAT WILL PASS
           BEFORE THE FIRST OF THE 5 TYPES
           (IOINTRVL OF 1,2,3,4, AND 13) OF
           STATUS REPORTS (EITHER ARMY OR TRW) WILL BE
           PRINTED.  =2 MEANS THE FIRST REPORT WILL START AT
           MINUTE 2.  ONLY 5 VALUES FOR I HAVE MEANING
           (1, 2, 3, 4, AND 13) BECAUSE THESE CORRESPOND TO
           THE IOINTRVL ELEMENTS THAT DETERMINE THE STATUS
           REPORT OUTPUT INTERVAL.

IO001                                                              IONAME
           LOGICAL UNIT NUMBER OF EBCDIC DATA BASE INPUT
           CURRENTLY ASSIGNED TO UNIT 5

IO002                                                              IONAME
           FORMATTED ECHO OUTPUT OF EBCDIC DATA BASE IPUT
           CURRENTLY ASSIGNED TO UNIT 8

IO003                                                              IONAME
           LOGICAL UNIT NUMBER USED FOR STORING RESTART
           INFORMATION. CURRENTLY UNUSED AND ASSIGNED TO UNIT 8

IO004                                                              IONAME
           LOGICAL UNIT NUMBER USED FOR STORING RESTART
           INFORMATION. CURRENTLY UNUSED AND ASSIGNED TO UNIT 9
```

```
IO101                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT6

IO102                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT6

IO103                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT6

IO104                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT6

IO105                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO106                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO107                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO108                                                                IONAME
               LOGICAL UNIT NUMBER-USED BY GENFIR,ASSIGNED TO 6

IO109                                                                IONAME
               LOGICAL UNIT NUMBER USED BY NEWENG,ASSIGNED TO 6

IO110                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO111                                                                IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6
```

```
IO112                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO113                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO114                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO115                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO116                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO117                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO118                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO119                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO120                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6

IO121                                                                   IONAME
               LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6
```

IO301	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IO302	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IO303	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IO310	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IO320	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IO400	LOGICAL UNIT NUMBER,RESERVED, ASSIGNED TO UNIT 6	IONAME
IPDFNA	NAMELIST DEGRADATION USED FOR MANNING PRIORITY OF A VEHICLE WHICH IS OUT OF AMMO IN A STATIONARY UNIT.	MOUNTCOM
IPDSFW	NAMELIST DEGRADATION USED FOR MANNING PRIORITY OF A SUPPORT-FIRE WEAPON IN A UNIT WHICH IS RECEIVING DIRECT FIRE THIS DEGRADATION NOT APPLIED IF WEAPON IS ALSO A VEHICLE AND UNIT IS MOVING.	MOUNTCOM
IPFLG	PRINT FLAG FOR DIRECT FIRE REPORT INDICATING:(=0)NO FIRING THIS MINUTE; (=1)FIRING THIS MINUTE; (=2)EMPTY OUT BUFFER FOR LAST REPORT OF FIRING	PRINTFIR

```
IPLM     (I)                                                              MSCLAN
                BEGIN (I=1) AND END (I=2) OF WEAPONS FUNCTION TABLE
                SEARCH AGAINST PERSONNEL AS TARGET

IPPREC   (IPPM)                                                           PPLANREC
                STARTING DISK RECORD NUMBER FOR PRE-PLAN MISSION
                NO. IPPM  (1<=IPPM<=10)

IPRNO    (IUT,K)                     UTINP                                C
                BYTE-PACKED ARRAY GIVING 40 EQUIPMENT MANNING
                PRIORITIES FOR UNIT TYPE IUT.  NUMBERS OF COR-
                RESPONDING EQUIPMENT TYPES GIVEN BY ARRAY INPUT.
                (1<=IUT<=20,1<=K<=10)

IPRVENG (JU,JAU)                                                          AIRDTECT
                BIT MATRIX INDICATING WHETHER GROUND UNIT IGU IS
                CURRENTLY ENGAGING AIR UNIT JAU WITH AIR DEFENSE
                WEAPONS.  IGU IS USED TO DETERMINE JU.
                (1<=JU<=4,1<=JAU<=10)

IPVCE    (IEQ,IMODE)                 EQINP                                A2
                FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
                >= 0), PERSONNEL VULNERABILITY CLASS ASSOCIATED
                WITH EACH MODE IMODE OF EQUIPMENT TYPE IEQ.
                FOR AIR EQUIPMENT OTHER THAN AN AIRCRAFT (IEQCOD
                (IEQ) = -2 OR -3), EQUIPMENT NUMBER OF THE
                IMODE-TH ALLOWABLE AIRCRAFT TYPE ON WHICH IEQ
                MAY BE USED.  (HENCE, A MAXIMUM OF EIGHT AIR-
                CRAFT PER EQUIPMENT TYPE.)  THE FIRST ZERO EN-
                COUNTERED IMPLIES NO OTHER ALLOWABLE AIRCRAFT.
                (1<=IEQ<=80,1<=IMODE<=8)

IPWT     (IUT,J)                     UTINP                                C
                FOR GIVEN UNIT TYPE IUT, A BYTE PACKED LIST OF
                EQUIPMENT TYPE NUMBERS.  THEIR ASSOCIATED MANNING
                PRIORITIES ARE GIVEN BY CORRESPONDING BYTES OF
                IPRNO.  (1<=IUT<=20,1<=J<=10)
```

```
IQ                                                              AIRDEFNS
                NUMBER OF CURRENT QUARTER MINUTE (1 <= IQ <= 4).

IRAFT    (IRAFT)                    UNINP                       RAFTS
                BIT PACKED ARRAY CONTAINING DATA INDICATING WHETHER
                THE K-TH (1<=K<=100) UNIT HAS A RAFT IN ITS EQUIP-
                MENT LIST WHERE K IS THE K-TH BIT FROM IRAFT(1)
                (1<=IRAFT<=4).  DONE FOR TEST PURPOSES, PROBABLY
                SHOULD NOT BE USED.

IRAND                                                           RANDOM
                SEED FOR RANDOM NUMBER GENERATOR

IRATT                               NAMELIST                    ROUTING
                ROUTING OF MESSAGES FROM THE RATT .
                   =0     IGNORE (ROUTE TO NONE OF THE CONTROLLERS)
                    1     ROUTE TO CONTROLLER 1
                    2     ROUTE TO CONTROLLER 2
                    3     ROUTE TO CONTROLLER 3
                    4     ROUTE TO CONTROLLER 1 AND 3
                    5     ROUTE TO CONTROLLER 2 AND 3
                    6     ROUTE TO CONTROLLER 1 AND 2
                    7     ROUTE TO CONTROLLER 1,2 AND 3

IRDELX                                                          LOSCIN
                LENGTH OF A TERRAIN DATA GRID BLOCK IN METERS IN THE
                X-DIRECTION

IRDELY                                                          LOSCIN
                LENGTH OF A TERRAIN DATA GRID BLOCK IN METERS
                IN THE Y-DIRECTION

IRDNPTS (IRD)                       ROADINP                     ROADS
                NUMBER OF POINTS IN THE IRD-TH ROAD (1<=IRD<=50)
```

```
IRDSTRT (JRD)                                                   ROADS
              NUMBER OF THE FIRST X,Y POINT IN ARRAYS IROADX AND
              IROADY WHICH BELONGS TO THE JRD-TH ROAD
              (1<=JRD<=50)

IRDTYPE (IRD)                       ROADINP                     ROADS
              TYPE OF ROAD IRD   (1<=IRD<=50)
               1= TWO OR MORE LANE AWHS
               2= ONE LANE AWHS
               3= ONE LANE AWLS

IRDWDTH (IRDT)                      ROADINP                     ROADS
              THE WIDTH IN METERS OF THE 3 TYPES OF ROADS
              (1<=IRDT<=3)

IRECOVER                            NAMELIST                    RECOVER
              MINUTES INTO THE GAME TO WHICH THE RECOVERY
              PROCEDURE IS BEING DONE.  SEE DATA BASE/OPERATIONS
              MANUAL, APPENDIX B, SOP NUMBER 8.

IREDAMMO                            NAMELIST                    REDCONS
              THIS CONTROLS CONSIDERATION OF AMMUNITION IN
              READINESS CONDITION CALCULATIONS.
              = 0 DO NOT CONSIDER AMMUNITION IN REDCON
                  CALCULATIONS.
              = 1 DO CONSIDER AMMUNITION IN REDCON CALCULATIONS

IREDCON (JU)                                                    UREDCON
              THE READINESS CONDITION FOR UNIT JU (1<=JU<=100)

IREENG  (IOPG)                      OGINP                       G
              IF THE IOPG-TH OPERATIONAL GP. IS ENGAGED, IREENG IS
              THE MINIMUM DISTANCE OF ITS FORWARD-MOST UNIT FROM
              ENEMY FEBA THAT WOULD PERMIT AUTOMATIC TRANSFER
```

```
                OF GROUPING FROM ITS CURRENT ENGAGEMENT TO A
                CLOSER, NEW ENGAGEMENT (AND THEN ONLY IF FORWARD-
                MOST UNIT*S STATUS CODE IS 0). UNLESS THERE IS A
                REASON FOR KEEPING ATTENTION OF AN OPERATIONAL
                GROUPING FOCUSED ON ITS PRESENT ENGAGEMENT,
                IREENG MIGHT OFTEN BE SET TO APPROPRIATE NGARNG.
                (1<=IOPG<=20)

IRFEBA  (JU)                                                  BLEFT2
                DISTANCE OF UNIT JU FROM LOCAL ENEMY FEBA
                (NEGATIVE NUMBER IMPLIES THAT UNIT IS BEHIND
                ENEMY FEBA.  (1<=JU<=100)

IRFRNT  (JENG)                                                F
                HALF-FRONTAGE OF RED FORCE IN THE JENG-TH
                ENGAGEMENT.  (1<=JENG<=12)

IROADX  (IRDSG)                   ROADINP                     ROADS
                THE X COORD. OF ALL THE INPUT ROADS.  INDEX INTO
                ARRAY FOR ROAD N GIVEN BY IRDSTRT(N).
                (1<=IRDSG<=500)

IROADY  (IRDSG)                   ROADINP                     ROADS
                THE Y COORD. OF ALL THE INPUT ROADS.  INDEX INTO
                ARRAY FOR ROAD N GIVEN BY IRDSTRT(N).
               .(1<=IRDSG<=500)

IRSTOP  (I)                                                   STOPC
                ARRAY IS INITIALIZED BY INPUT BUT ITS VALUE IS NOT
                USED.  (1<=I<=5)

IRT                                                           P
                AN INDEX INDICATING LINE NUMBER IN MODE SELECTION
                CODE (MUSLCT) TABLE (COMMUNICATION BETWEEN
                ORGFIR AND SCHRMU).
```

IRTASKS NAMELIST ENGRWORK

TOTAL NUMBER OF ENGINEERING TASKS CURRENTLY UNDERWAY FOR THE RED ARMY

IRTET (JWTS,J) D

FOR EACH ENTRY IN WEAPON-UNIT SET JWTS, A LIST CONTAINING DISTANCE TO JTH TARGET UNIT AT WHICH IT CAN FIRE (CORRESPONDS TO ITET). SOMETIMES USED AS TEMPORARY STORAGE (1<=JWTS<=30,1<=J<=8)

ISAVEINP NAMELIST

CONTROLS CREATION OF BINARY DATABASES.

= 0 DO NOT CREATE BINARY DATABASE.

= 1 CREATE BINARY FILE OF DATABASE. SEE SECT 5.7 OF THE USERS MANUAL.

ISAVEOK SAVEOK

=0 SAVE FILES RECORD LENGTHS SUFFICIENTLY LARGE

=1 AT LEAST ONE OF THE TWO SAVE FILES HAS RECORDS OF INSUFFICIENT SIZE.

ISAVE1 S

AT FIRST OF A SEQUENCE OF CALLS TO STRIP, THIS CELL CONTAINS A PACKED CODE WORD CONTAINING SEVERAL DIFF- ERENT NUMERICAL VALUES. THE NUMERICAL VALUE CONTAINED IN ITEST1 IS STRIPPED AWAY, LEAVING ISAVE1 READY TO HAVE ANOTHER VALUE STRIPPED FROM IT.

ISBEVNT FIRORG

SUBEVENT TYPE FOR FIRE CONTROL COMMANDS, DEFINED AS FOLLOWS:

- 0=PERCENT OF FIRE, CONSIDER SUPPRESSION
- 1=ROUNDS/MINUTE, CONSIDER SUPPRESSION
- 2=PERCENT OF FIRE, NO SUPPRESSION
- 3=ROUNDS/MINUTE, NO SUPPRESSION
- 7=CEASE FIRE

9=HOUSEKEEP FIRE CONTROL TABLE

```
ISEEALL                            NAMELIST                         DUMMYLOS
               FOR LOSFAKE=1 ONLY :
                ISEEALL=1        LINE OF SIGHT EXISTS FOR ALL UNITS
                      =0         LINE OF SIGHT DOES NOT EXIST FOR
                                 ALL UNITS - USE NAME RANGE FUNCTION
                                 TO DETERMINE LINE OF SIGHT

ISENNAME(I,J)                                                       SCENARIO
               SCENARIO NAME.  UP TO 12 CHARACTERS, LEFT
               JUSTIFIED, WHICH APPEAR ON THE SIMULATION
               CONTROL MENU AND IN ≡INITIALIZING FOR
               SCENARIO . . .≡ RAM ALERT FOR THE TEN
               STANDARD SCENARIOS.
               THE I-TH WORD OF THE J-TH SCENARIO (1<=I<=3,
               1<=J<=10)

ISENNT  (IGS)                      SENSINP                          SENSTYPE
               THE EQUIPMENT TYPE NUMBER FOR SENSOR TYPE IGS:
               WHERE IGS =1     BINOC. 6X30
                         =2     BINOC. 7X30
                         =3     NOD TVS-4
                         =4     STARLITE SCOP  TVS-2
                         =5     AN/PPS-5
                         =6     AN/MPQ-4A
                         =7     AN/TPS-25A
                         =8     GRIEF
                         =9     GRIM
                         =10    GRIP
                         =11    SLAR
                         =12    KA 30
                         =13    KA 60
                         =14    36 IN. VERTICAL RADAR

ISIZE   (IU)                       CMDUNINP UNINP  OGINP            DISPLAY
               UNIT SIZE OF UNIT IU.  A NEGATIVE SIGN PRECEDING
               SIZE MEANS THE UNIT IS A COMMAND POST (1<=IU<=150)
```

```
        ISIZE=1  SQUAD
             =2  SECTION
             =3  PLATOON
             =4  COMPANY/BATTERY/TROOP
             =5  BATTALION
             =6  REGIMENT
             =7  BRIGADE
             =8  DIVISION
             =9  CORPS
             =10 ARMY
             =11 ARMY GROUP

ISIZNAM (IUCLS)                                                    FIRALRT
        FOUR LETTER ABBREVIATIONS OF DIFFERENT CLASSES OF
        UNITS  (1<=IUCLS<=11):
        IUCLS=1 SQUAD
              2 SECTION
              3 PLATOON
              4 COMPANY/BATTERY/TROOP
              5 BATTALION
              6 REGIMENT
              7 BRIGADE
              8 DIVISION
              9 ARMY
             10 ARMY GROUP

ISKIP                                                              SKIP
        MULTIPLE OF THE BASE INCREMENT TO BE USED IN
        SUBROUTINE LOSVEG.  WHEN ISKIP>1, FEWER POINTS
        ARE TESTED FOR TERRAIN BLOCKAGE ALONG THE LINE
        OF SIGHT THAN WHEN ISKIP=1.

ISOILE  (L)                                                        RELIEFE
        THE NUMBER OF INTERSECTIONS OF 75 METER GRID LINES
        WITH DMA SOIL CONTOUR LINES (1<=L<=361) SEE
        SECTION 5.2.1 OF USERS MANUAL AND PAGE 283 OF
        THE DATABASE/OPERATIONS MANUAL.
```

```
ISOILTYP                          NAMELIST                          DUMMYLOS
          THE SOIL TYPE FOR ALL UNITS WHEN LOSFAKE=1

ISPRNO  (J,IGS)                   SENSINP                           SENSPRIO
          MANNING PRIORITY FOR SENSOR TYPE IGS (SEE
          UNIT TYPE INPUT DECK FOR MANNING PRIORITIES OF OTHER
          EQUIPMENTS).
          J = 1 PRIORITY DURING DAYLIGHT.
          J = 2 PRIORITY DURING DARKNESS.
          -1 MEANS DO NOT MAN, 1 IS THE HIGHEST
          PRIORITY, 2 THE NEXT HIGHEST, ETC.

ISPTUNIT(JU)                                                        SPTGUNIT
          FOR UNIT JU, THE SUPPORT FIRE UNIT ASSIGNED TO UNIT
          (1<=JU<=150)

ISRBF                             FSINP                             FORBLK
          MINIMUM DISTANCE (IN METERS) FROM FRIENDLY FORCES
          THAT BLUE SUPPORT FIRE WEAPONS MAY LAY DOWN FIRE.

ISRCOD  (I)                       MISCVAR                           E
          SUBROUTINE ELIMINATION CODES  (1<=I<=8)
            I=7  UNBLOK(RED FIRING)
              8  UNBLOK(BLUE FIRING)

ISRRF                             FSINP                             FORBLK
          MINIMUM DISTANCE (IN METERS) FROM FRIENDLY FORCES
          THAT RED SUPPORT-FIRE WEAPONS MAY LAY DOWN FIRE.

ISSLCT  (I)                       SIGINP                            Q
          I TH ENTRY IN THE SUPPRESSION CRITERION SELECTION
          TABLE(1<=I<=40)OF THE FORM CXYYZSS , WHERE
             C=NUMBER OF THE SUPPRESSION CRITERION
             X=UNIT TYPE
            YY=UNIT OPERATION STATE
             Z=1 OR 2 (RED OR BLUE)
```

```
        SS=NUMBER OF THE SUPPRESSION CURVE TO USE.

ISSTOP   (I)                      MISCVAR                       STOPC
            ARRAY IS INITIALIZED BY INPUT BUT ITS VALUE IS NOT
            USED.  (1<=I<=16)

ISTATU   (JU)                                                   BOBBY
            STATUS CODE OF UNIT JU (1<=JU<=100):
              -1 -- AIR UNIT OR DEFUNCT GROUND UNIT.
               1 -- IN ENGAGEMENT, ELIGIBLE FOR DIRECT FIRE
                    AGAINST ENEMY UNITS IN SAME ENGAGEMENT.
               0 -- OTHER

ISTOP    (JU)                                                   TSTOP
            THE LENGTH OF TIME WHICH UNIT JU HAS BEEN STOPPED
            (1<=JU<=100)

IT       (JWTS)                                                 D
            LIST OF UNITS IN CURRENT TARGET-UNIT SET JWTS
            (1<=JWTS<=30)

ITAP     (IUT,ICOLOR)             UTINP                         C
            NUMBER OF THE TARGET-ACQUISITION PROBABILITY CURVE
            TO USE FOR DETECTION OF UNITS BY A GROUND-BASED
            SURVEILLANCE SYSTEM. FOR IUT = TYPE OF
            UNIT TO BE DETECTED;ICOLOR = 1 IF UNIT IS RED, =2 IF
            UNIT IS BLUE. IF ITAP =0, DETECTION PROBABILITY =1.0
            (1<=IUT<=20)

ITCODE   (JU)                                                   BLEFT2
            TARGET MARKER CODE INDICATING PRIMARY (=0)
            OR SECONDARY (=1) TARGETS IN UA (JU)
            (SOMETIMES USED AS TEMPORARY STORAGE)  FOR
            UNIT JU  (1<=JU<=100)
```

```
ITEQU    (IU,J)                      UNINP                              BOBBY
                LIST OF (J=1 TO 14) EQUIPMENT TYPES IN UNIT IU,
                PRINCIPAL TYPE FIRST AND SINK OR CATCH-ALL
                TYPE LAST. (SUPPORT-FIRE WEAPONS ARE ALWAYS
                LISTED BEFORE OTHER CATEGORIES.)  (1<=IU<=100)

ITEST1                                                                  S
                CONTAINS THE SINGLE NUMERICAL VALUE WHICH HAS BEEN
                STRIPPED OUT OF THE CODE WORD AND IS READY TO BE
                EXAMINED .

ITET     (JWTS,J)                                                       D
                TARGET ELIGIBILITY TABLE. FOR EACH ENTRY IN
                WEAPON-UNIT SET JWTS, A LIST CONTAINING ALL
                J-TH ELIGIBLE TARGET UNITS (1<=JWTS<=30,1<=J<=8)

ITGTLST (I,J)                                                           FIROVRD
                TARGET LIST FOR THE I TH ENTRY ON THE IFIROVRD TABLE
                FOR UP TO 8 TARGETS (J=1 TO 8) PACKED AS FOLLOWS:
                    BITS  0- 9 -- TARGET NUMBER
                                         0 XY POINT
                                     1-100 UNIT NUMBER
                                   101-200 BRIDGE NUMBER+100
                                   201-700 ROAD SEGMENT NUMBER+200
                    BITS 10-17 -- DURATION IN MINUTES
                                  (USED BY RPM ONLY)
                    BITS 18-31 -- NUMBER OF ROUNDS TO FIRE, OR
                                  PERCENT OF FIRE * 100
                ENTRIES 9 AND 10 ((I,9) AND (I,10)) ARE 8 BYTE-SIZE
                POINTERS TO THE IMPACTING FIRES ARRAY (IXYIM), ONE
                FOR EACH OF THE 8 TARGETS. WORD 9,BYTE 0 CORRESPONDS
                POINTERS TO THE IMPACTING FIRES ARRAY (IXYIM), ONE
                FOR EACH OF THE 8 TARGETS. WORD 9,BYTE 0 CORRESPONDS
                TO TARGET 1, ETC.
                (1<=I<=100,1<=J<=10)

ITGTN                                                                   P
                -1 IF TARGET ELEMENT IN UNIT II IS PERSONNEL;
```

```
            EQUIPMENT TYPE LIST NUMBER (ITEQU) IF TARGET
            ELEMENT IS EQUIPMENT.

ITIMCHK                          NAMELIST                          TIMCHK
            =0  NO TIMING CHECK PRINT-OUT IS REQUESTED
            =1  TIMING CHECK BY MODULE IS REQUESTED
            =2  DETAIL LINE OF SIGHT MODULE TIMING CHECK
            =3  SUMMARY TIMING CHECK REQUESTED
            >=5  LINE OF SIGHT(LOS) DEBUG PRINTOUT

ITIME                            MISCVAR                           FORBLK
            CURRENT TIME (INITIAL TIME AT INPUT).

ITIMED                                                             DTIME
            JTIMED(IN SAME COMMON) MINUS ITIME; USED BY SUBR.
            FORSIG TO CALCULATE COMMAND AND CONTROL EVENT
            ACTIVATION TIMES IN MINUTES SINCE SIMULATION START.

ITIMX                            MISCVAR                           FORBLK
            MAXIMUM TIME PERMITTED IN RUN.

ITM                                                                REMEV
            TIME (MINUTES)

ITMEVE                                                             EVDATA
            TIME (IN MINUTES SINCE SIMULATION START) AT WHICH
            EVENT THAT IS BEING SCHEDULED WILL OCCUR

ITMSTRT                                                            TIMSTRT
            TIME (IN UNITS OF CLOCK MINUTES) AT WHICH THE
            SIMULATION STARTS

ITNE                                                               EVINDT
            TIME (IN MINUTES SINCE SIMULATION START) AT WHICH
```

```
             NEXT EVENT WILL OCCUR

ITOTE   (I)                                                  ELTIMES
             ACCUMULATED TIME (IN 500TH OF A SECOND) SPENT IN
             COMPUTATIONAL LOOP NUMBER I   (1<=I<=30)

ITPPL   (IU)                      UNINP                      DISPLAY
             UNIT ARM/BRANCH/DUTY.  A NEGATIVE SIGN PRECEEDING
             MEANS UNIT IS AN OBSERVATION POST.   (1<=IU<=100)
                1  INFANTRY
                2  MECH INFANTRY
                3  AIRMOBILE INFANTRY
                4  AIRBORNE INFANTRY
                5  ARMOR
                6  CAVALRY
                7  ARMORED CAVALRY
                8  ANTI-TANK
                9  ARTILLERY,TOWED
                10 ARTILLERY,SP
                11 AIR DEFENSE
                12 ENGINEER
                13 SIGNAL
                14 MAINTENANCE
                15 MEDICAL
                16 ORDNANCE
                17 QUARTERMASTER

ITQUAL                                                       0
             =0 IF TVAL IS PRIMARY TARGET VALUE
             =1 IF TVAL IS SECONDARY TARGET VALUE.

ITRAV   (IU)                      UNINP                      BLEFT1
             TRAVEL CODE OF UNIT IU  (1<=IU<=100):
             0 - NOT APPLICABLE TO GROUND UNITS.  FOR AIR UNITS
                    IT MEANS THE AIR UNIT IS DEFUNCT.
             1 - UNIT AVOIDS ENGAGEMENT IF POSSIBLE
             2 - UNIT NEITHER DESIRES NOR AVOIDS ENGAGEMENT
                 UNTIL DESTINATION IS REACHED
```

```
                  3 - UNIT SEEKS ENGAGEMENT
                  4 - AIR UNIT

ITRAVG  (IOPG)                      OGINP                     G
                  TRAVEL CODE FOR THE IOPG-TH OPERATIONAL GROUP
                  (1<=IOPG<=20).  SEE ITRAV.

ITRC    (IVPOL)                                               DATAVEG
                  POLYGON TYPE FOR EACH VEGETATION POLYGON IVPOL
                  (1<=IVPOL<=225):
                  = 1 FOR TRIANGLE
                  = 2 FOR RECTANGLE
                  = 3 FOR CIRCLE

ITRGT   (JTGT)                                                PRINTFIR
                  NUMBER OF JTGT-TH TARGET UNIT BEING FIRED AT BY A
                  GIVEN WEAPON.  (1<=JTGT<=50)

ITU                                                           DUMB
                  TARGET UNIT NUMBER (OR ROAD, BRIDGE, OR X-Y POINT
                  CODE).  BEING HIT BY GROUND SUPPORT FIRE.

ITYPDW  (IUT,ICOLOR)                UTINP                     C
                  MAXIMUM DISTANCE (IN METERS) BEYOND END OF ENEMY
                  FEBA IN AN ESTABLISHED ENGAGEMENT THAT AN UNENGAGED
                  RED (ICOLOR=1) OR BLUE(ICOLOR=2) UNIT (OR ITS OPER-
                  ATIONAL GROUPING) OF A GIVEN TYPE IUT WILL BE ALLOW-
                  ED TO JOIN EXISTING ENGAGEMENT (RATHER THAN FORM A
                  NEW ONE).  THIS DISTANCE APPLIES ONLY TO ENCOUNTERS
                  BETWEEN UNITS, AND DISTANCE MAY BE NEGATIVE.
                  (1<=IUT<=20)

ITYPEU  (IU)                        UNINP                     BSTAT
                  UNIT TYPE FOR UNIT IU  (1<=IU<=100)
```

```
IT1                                                              REMEV
             TYPE OF EVENT(S) TO BE DELETED .

IT2                                                              REMEV
             SUBTYPE OF EVENT(S) TO BE DELETED

IU                                                               AEDUM
             NUMBER OF AIR UNIT (NFDU <= IU <= NLDU)

IUA      (JU)                                                    BLEFT2
             EQUIVALENCED TO UA.  SEE DEFINITION OF UA.

IUASFT   (IUGS,ICOLOR)              SENSINP                      UASF
             SENSOR FIELD TYPE FOR IUGS TH UGS FIELD FOR EACH
             FORCE  (1<=IUGS<=10)
              ICOLOR=1 RED FORCE
              ICOLOR=2 BLUE FORCE

IUCOD    (I)                                                     FIROUTCD
             LIST OF UNITS FOR WHICH FIRE REPORT IS DESIRED; ZERO
             TERMINATES THE LIST; A VALUE >100 CAUSES ALL UNITS
             TO BE REPORTED ON; ALL WEAPONS IN A UNIT REPORTED ON
             (1<=I<=4)

IUDEP    (IU)                       UNINP                        BSTAT
             DEPTH OF UNIT IU IN METERS.  (1<=IU<=100)

IUNIM    (JU)                                                    IMPACT
             BIT-PACKED ARRAY INDICATING WHICH UNITS WERE FIRED
             ON DURING THE MINUTE (1=FIRED ON),WHERE WORD 1,BIT 0
             IS THE INDICATOR FOR UNIT 1, ETC. (1<=JU<=4)

IUNIMXY (JU)                                                     UNIMXY
             FOUR WORD ARRAY OF BIT FLAGS INDICATING IF A UNIT
```

```
          HAS BEEN HIT WITH FIRE DIRECTED AT AN XY POINT; SUCH
          UNITS ARE THEN FLAGGED NOT TO HAVE AN IMPACTING FIRE
          SYMBOL AT THEIR CENTER, SINCE THE XY-POINT SYMBOL IS
          WITHIN THE AREA OF THE UNIT  (1<=JU<=4)

IUNIT    (IU)                 NAMELIST                        ROUTING
          ROUTING CODE FOR ALERTS GENERATED BY UNIT IU
          (1<=IU<=100)
            =0    IGNORE (ROUTE TO NONE OF THE CONTROLLERS)
             1    ROUTE TO CONTROLLER 1
             2    ROUTE TO CONTROLLER 2
             3    ROUTE TO CONTROLLER 3
             4    ROUTE TO CONTROLLER 1 AND 3
             5    ROUTE TO CONTROLLER 2 AND 3
             6    ROUTE TO CONTROLLER 1 AND 2
             7    ROUTE TO CONTROLLER 1,2 AND 3

IUNTFIR (JJ)                  NAMELIST
          ALLOWS SELECTED DEBUG PRINT OF THE FIRING CODE.
          1<=JJ<=10.  UP TO 10 INDIVIDUAL UNITS MAY BE
          MONITORED WITH DEBUG PRINTOUT.  FOR IUNTFIR(JJ)
          = 1<=I<=99, PRINT DEBUG REPORT FOR UNIT I.  FOR
          IUNTFIR(JJ) > 100, PRINT FIRE DEBUG FOR ALL
          UNITS.

IUSTOP   (I)                  MISCVAR                         STOPC
          THE ADDRESS IS USED BY SIMULATION CONTROL MODULE TO
          DESIGNATE THE BEGINNING OF THE 5 BLOCKS OF COMMON
          BEING SAVED FOR RESTART. IT IS INITIALIZED BY INPUT
          BUT THE VARIABLE IS NOT USED.  (1<=I<=16)

IUWID    (IU)                 UNINP                           BSTAT
          WIDTH OF UNIT IU IN METERS.  (1<=IU<=100)

IVA      (JU)                                                 BLEFT2
          EQUIVALENCED TO VA.  SEE DEFINITION OF VA.
```

```
IVAA      (JU)                                                        MOVTMP
                THIS ARRAY IS A TEMPORARY STORAGE ARRAY FOR
                COMMUNICATION BETWEEN THE MOVEMENT SUBROUTINES.
                = -1 MEANS THE UNIT ARRIVED BUT WILL NOT
                     MAKE A 2ND MOVE THIS TIME STEP.
                =  0 MEANS THE UNIT DID NOT ARRIVE.
                = +1 MEANS THE UNIT ARRIVED, HAS BEEN
                     GIVEN A NEW DESTINATION, AND
                     WILL MOVE A 2ND TIME THIS TIME STEP.
                (1<=JU<=100)

IVDT      (JEVT)                                                      EVDATA
                EVENT DATA OF EVENT BEING SCHEDULED  (1<=JEVT<=64)

IVEGCLAS                        NAMELIST                              DUMMYLOS
                THE VEGETATION TYPE AROUND ALL UNITS WHEN LOSFAKE=1

IVGLOC  (I,ITDGB)                                                     DATAVEG
                POLYGON NUMBER FOR THE FIRST VEGETATION POLYGON
                AND NUMBER OF VEGETATION POLYGONS FOR EACH OF THE
                64 TERRAIN DATA GRID BLOCKS  (1<=I<=2,1<=ITDGB<=64)

IVGSL     (JU)                                                        PROBLOS
                THE VEGETATION (FIRST HALF WORD) AND SOIL (SECOND
                HALF WORD) CLASSES FOR UNIT JU.  (1<=JU<=100)

IVRTCLE                                                               OBCHECK
                FLAG INDICATING WHETHER TANGENT OF THE LINE
                DESCRIBING PATH OF MOVEMENT OF A GIVEN UNIT I DURING
                THE CURRENT TIME STEP IS FINITE OR INFINITE WHERE:
                =0 FINITE   (I.E. LINE IS NONVERTICAL)
                =1 INFINITE (I.E. LINE IS VERTICAL)

IW        (JWTS)                                                      D
                LIST OF UNITS IN CURRENT WEAPONS SET JWTS.
```

```
                 (1<=JWTS<=30)

IWCIR    (I,J)                            NAMELIST                          WEATHR
                 INFORMATIONS FOR THE J TH LOCAL WEATHER AREA
                 (1<=J<=10)
                    I=1  PRESENT X COORDINATE
                      2  PRESENT Y COORDINATE
                      3  RADIUS IN METERS
                      4  WEATHER CLASS
                      5  CHANGE IN X PER TIME STEP
                      6  CHANGE IN Y PER TIME STEP
                 NOT AVAILABLE IN CATTS.  WAS NEVER FINISHED.

IWCLS                                     NAMELIST                          WEATHR
                 PRESENT GLOBAL WEATHER CLASS

IWCOD    (I)                                                                FIROUTCD
                 LIST OF WEAPONS FOR WHICH FIRE REPORT IS DESIRED;
                 ZERO TERMINATES THE LIST; A VALUE >80 CAUSES ALL
                 WEAPONS TO BE REPORTED ON; ALL UNITS CONTAINING A
                 SPECIFIED WEAPON ARE REPORTED ON   (1<=I<=3)

IWEATHER                                  NAMELIST                          ROUTING
                 ROUTING DIRECTIVE FOR WEATHER ALERT .
                    =0     IGNORE (ROUTE TO NONE OF THE CONTROLLERS)
                     1     ROUTE TO CONTROLLER 1
                     2     ROUTE TO CONTROLLER 2
                     3     ROUTE TO CONTROLLER 3
                     4     ROUTE TO CONTROLLER 1 AND 3
                     5     ROUTE TO CONTROLLER 2 AND 3
                     6     ROUTE TO CONTROLLER 1 AND 2
                     7     ROUTE TO CONTROLLER 1,2 AND 3

IWPNFIR (KK)                              NAMELIST
                 ALLOWS SELECTED DEBUG PRINTOUT OF FIRING CODE.
                 1<=KK<=10, I.E. UP TO 10 EQUIPMENTS MAY BE
                 MONITORED WITH DEBUG PRINTOUT.  FOR IWPNFIR(KK)
```

```
                  =1<=IEQ<=80, PRINT A FIRE DEBUG REPORT FOR
                  EQUIPMENT IEQ.  WHEN IWPNFIR(KK)>80, PRINT FIRE
                  DEBUG REPORTS FOR ALL EQUIPMENTS.

IWPTS                                                          MSCLAN
                  USED TO SAVE WEAPON NUMBER FROM ONE WEAPON TABLE
                  SEARCH TO ANOTHER BY SUBROUTINE SCHRMU

IWPTST                                                         MSCLAN
                  USED TO SAVE WEAPON NUMBER FROM ONE WEAPON TABLE
                  SEARCH TO ANOTHER BY SUBROUTINE WPNFIR

IWT      (JWTS)                                                BLEFT2
                  TARGET ALLOCATION VECTOR FOR UNIT JWTS. IN A
                  GIVEN WEAPON-TARGET SET, IF UNIT IS A WEAPON
                  UNIT, IWT CONTAINS THE NUMBER OF ENEMY UNITS
                  AT WHICH IT CAN FIRE. IF UNIT IS A TARGET
                  UNIT, IWT CONTAINS THE NUMBER OF ENEMY UNITS
                  WHICH CAN FIRE AT IT (SOMETIMES USED AS
                  TEMPORARY STORAGE).  (1<=JWTS<=100)

IWTRNG                                                         D
                  DISTANCE (IN METERS) BETWEEN WEAPON UNIT AND TARGET
                  UNIT BEING CONSIDERED.

IWU                                                            DUMB
                  WEAPONS UNIT NUMBER (UNIT DELIVERING GROUND
                  SUPPORT FIRE).

IXAIR    (JAIRTE,JAU)                                          AIRLOC
                  X-COORDINATE OF AIR UNIT JAU AT JAIRTE-TH POINT
                  IN THIS MINUTE.  (1<=JAIRTE<=8,1<=JAU<=10)
                  THERE ARE 4 QUARTER MINUTE POINTS PLUS 0 TO 4
                  INTERMEDIATE CHECK POINTS (IACPX) IN EACH TIME
                  STEP (MINUTE).
```

IXAIRFG (JAIRTE,JAU) — FGAIRLOC

X-COORDINATE OF AIR UNIT JAU (1<=JAU<=NLDU-NFDU+1) AT THE JAIRTE-TH POINT (1<= JAIRTE <= 8) IN THIS MINUTE. THE MINUTE IS BROKEN DOWN INTO QUARTER MIN. POINTS PLUS ANY AIR-ROUTE POINTS THAT ARE ARRIVED AT IN THE MINUTE INTERVAL. THIS ARRAY IS IDENTICAL TO IXAIR EXCEPT IXAIR REPRESENTS CURRENT MINUTE DATA. IXAIRFG EXIST ONLY FOR USE BY THE FOREGROUND PROGRAMS. (1<=JAU<=10)

IXBOUND (I) — LAREA

VALUES FOR X (I=1 OR 2) BOUNDING THE LETHAL AREA OF IMPACTING ORDNANCE(IXBOUND(2) IS THE SMALLER VALUE)

IXF (JOPG) — G

COORDINATE OF THE JOPG-TH OPERATIONAL GROUPING IN ITS DIRECTION OF MOVEMENT IN A SYSTEM ROTATED ABOUT THE FIXED ORIGIN. (1<=JOPG<=20)

IXMAX — V

MAXIMUM VALUE OF ANY X-COORDINATE THAT MAY BE PLOTT-ED IN FIXED COORDINATE SYSTEM.

IXMIN — V

MINIMUM VALUE OF ANY X-COORDINATE.

IXPHIB (JENG) — F

POSITION OF BLUE FEBA IN THE DIRECTION OF BLUE MOVEMENT (=-9999999 IF ENGAGEMENT NO LONGER EXISTS) OF THE JENG-TH ENGAGEMENT. (1<=JENG<=12)

IXPHIR (JENG) — F

POSITION OF RED FEBA IN THE DIRECTION OF RED MOVEMENT (=9999999 IF ENGAGEMENT NO LONGER EXISTS) OF THE JENG-TH ENGAGEMENT. (1<=JENG<=12)

```
IXPOSC                                                                  LOSCIN
                   MINIMUM X-COORDINATE TACTICAL AREA OF OPERATIONS

IXPTH    (I,JRTE)                     MOVINP                            H
                   X-COORDINATE OF THE I TH POINT FOR THE ROUTE JRTE
                   (1<=I<=7,1<=JRTE<=50)

IXY      (IU,J)                       UNINP                             BSTAT
                   ACTUAL POSITION COORDINATES (J=1 FOR X,J=2
                   FOR Y) OF UNIT IU.  (1<=JU<=100)

IXYIM    (JU)                                                           IMPACT
                   EACH ELEMENT OF THIS ARRAY, IF NON-ZERO, INDICATES
                   THE XY LOCATION OF AN IMPACTING FIRE, AS FOLLOWS:
                        -SIGN OF THE WORD INDICATES RED(-) OR BLUE(+)
                        -AFTER CONVERTING TO A POSITIVE NUMBER,
                         BITS  0-15 -- X LOCATION
                         BITS 16-31 -- Y LOCATION
                   (1<=JU<=100)

IXYIMPTR(JMPF)                                                          IMPACT
                   POINTER INTO IXYIM ARRAY USED BY AIR UNITS
                   DELIVERING ORDNANCE, ENABLING A SPECIAL SYMBOL TO BE
                   DRAWN FOR AIR IMPACTING FIRES  (1<=JMPF<=10)

IXYOG    (JOPG,J)                                                       G
                   X (J=1) AND Y (J=2) COORDINATES OF JOPG-TH
                   OPERATIONAL GROUPING  (1<=JOPG<=20)

IYAIR    (JAIRTE,JAU)                                                   AIRLOC
                   Y-COORDINATE OF AIR UNIT JAU AT JAIRTE-TH POINT
                   IN THIS MINUTE.  (1<=JAIRTE<=8,1<=JAU<=10)
                   THERE ARE 4 QUARTER MINUTE POINTS PLUS 0 TO 4
                   INTERMEDIATE CHECK POINTS (IACPY) IN EACH TIME
```

```
                STEP (MINUTE).

IYAIRFG (JAIRTE,JAU)                                                    FGAIRLOC
                Y-COORDINATE OF AIR UNIT JAU (1<= JAU <= NLDU-NFDU)
                AT THE JAIRTE-TH POINT (1<= JAIRTE <= 8) IN THIS
                MINUTE.  (1<=JAU<=10)
                (SEE,DEF. OF IXAIRFG.)

IYBDS    (I,J)                    FSINP                                 U
                LOWER(J=1) AND UPPER(J=2) Y-BOUNDS ON THE SECTOR IN
                WHICH WEAPON FIRE WILL BE ALLOCATED WHERE I IS
                THE INDEX CORRESPONDING TO IFSTAB I INDEX.
                (1<=I<=80)

IYBOUND (I)                                                             LAREA
                VALUES FOR Y (I=1 OR 2) BOUNDING THE LETHAL AREA OF
                IMPACTING ORDNANCE(IYBOUND(2) IS THE SMALLER VALUE)

IYMAX                                                                   V
                MAXIMUM VALUE OF ANY Y-COORDINATE.

IYMIN                                                                   V
                MINIMUM VALUE OF ANY Y-COORDINATE.

IYPOSC                                                                  LOSCIN
                MINIMUM Y-COORDINATE FOR THE TACTICAL AREA
                OF OPERATIONS.

IYPTH    (I,JRTE)                 MOVINP                                H
                Y-COORDINATE OF THE I-TH POINT FOR THE ROUTE JRTE
                (1<=I<=7,1<=JRTE<=50)

IZAIR    (JAIRTE,JAU)                                                   AIRLOC
                Z-COORDINATE OF AIR UNIT JAU AT JAIRTE-TH POINT
```

```
                     IN THIS MINUTE.  (1<=JAIRTE<=8,1<=JAU<=10)
                     THERE ARE 4 QUARTER MINUTE POINTS PLUS 0 TO 4
                     INTERMEDIATE CHECK POINTS (IACPZ) IN EACH TIME
                     STEP (MINUTE).

IZAIRFG (JAIRTE,JAU)                                                        FGAIRLOC
                     Z-COORDINATE OF AIR UNIT JAU (1<= JAU <= NLDU-NFDU)
                     THE JAIRTE-TH POINT (1<= JAIRTE <= 8) IN THIS
                     MINUTE.  (SEE DEF. OF IXAIRFG.)  (1<=JAU<=10)

JIMSFLAG(JAU)                                                               WFNUMBR
                     LOGICAL ARRAY USED TO INDICATE IF AIR MISSION JAU
                     HAS BEEN ABORTED (JAU=1,10)

JKJK                                                                        T
                     NOT USED

JOLDDATA(JU)                                                                OLDMVDTA
                     HALFWORD PACKED ARRAY CONTAINING MOVEMENT DATA FOR
                     THE JU-TH (1<=JU<=100) UNIT WHERE THE FIRST HALF
                     WORD STORES THE FIRST MOVEMENT DATA VALUE (SEE
                     MVDT1(JU)) OF THE JU-TH UNIT AND THE SECOND HALF
                     WORD STORES THE SECOND MOVEMENT DATA (SEE
                     MVDT2(JU)) OF THE JU-TH UNIT

JSCEN                                                                       SCENARIO
                     THE CURRENT SCENARIO NUMBER

JSOILE  (M)                                                                 RELIEFE
                     SOIL DATA.  IN EACH HALF WORD, 2 PIECES OF DATA
                     ARE PACKED:  THE 4 LEFTMOST BITS CONTAIN SOIL TYPE
                     (1-15) THAT ENDS AT THIS INTERSECTION OF A 75 METER
                     GRID AND DMA SOIL CONTOUR LINE.  THE 12 REMAINING
                     BITS CONTAIN THE X COORDINATE (ROUNDED TO THE
                     NEAREST 25 METERS) OF THE INTERSECTION.  SEE
                     SECTION 5.2.1 OF THE USERS MANUAL OR PAGE 283
```

```
                OF THE DATABASE/OPERATIONS MANUAL.

JTGTPT  (JAU)                                                          AIRLOCPT
                INDEX WITHIN /AIRLOC/ ARRAYS FOR TARGET POINT FOR
                AIR UNIT JAU.  =0 IF AIR UNIT JAU HAS NO TARGET
                DURING THIS MINUTE.  (1<=JAU<=10)

JTIMEO                                                                 OTIME
                CLOCK TIME IN MINUTES CORRESPONDING TO START OF
                SIMULATION.

JTRAP   (I)                                                            JTRAP
                I=1-16 CONTENTS OF REGISTERS 0 TO 16 AT ENTRY TO
                           TRAP HANDLER
                I=17-18 CONTENTS OF PSD (PROGRAM STATUS DOUBLEWORD)
                           AT TIME OF TRAP.
                           BITS 15-31 OF JTRAP(I) HAS ONE PLUS
                           THE ADDRESS OF THE OFFENDING
                           INSTRUCTION OR THE ADDRESS OF THE
                           OFFENDING INSTRUCTION DEPENDING ON THE
                           TIME THE TRAP CONDITION IS DETECTED BY
                           THE SYSTEM RELATIVE TO THE INSTRUCTION
                           CYCLE
                I=19-34 CONTENTS OF REGISTERS 0 TO 16 AT TIME OF
                           TRAP. REGISTER PAIRS 5,6 AND 14,15
                           ARE USED BY FORTRAN FOR CALLING
                           LIBRARY AND SUBROUTINE LINKAGE.
                I=35 TRAP LOCATION. THIS ADDRESS TELLS YOU THE
                           TRAP CONDITION. SEE SIGMA 9 MANUAL.

JUA     (JU)                                                           G
                EQUIVALENCED TO XUA.  SEE DEFINITION OF XUA.

JVA     (JU)                                                           G
                EQUIVALENCED TO XVA.  SEE DEFINITION OF XVA.
```

```
KAIRPTS (JAU)                                                     FGAIRLOC
                NUMBER OF POINTS CALCULATED FOR AIR UNIT JAU DUR-
                ING PRECEDING MINUTE.  USED BY THE FOREGROUND.
                (1<=JAU<=10)

KEQMOV  (IUT,ICOLOR)              UTINP                           C
                FOR EACH UNIT TYPE IUT,RED(ICOLOR=1) OR
                BLUE(ICOLOR=2), A CODE INDICATING WHICH TYPES OF
                EQUIPMENT DETERMINE RATE OF MOVEMENT FOR THE UNIT
                (1<=IUT<=20):
                0 - ALL EQUIPMENT
                1 - DIRECT-FIRE WEAPONS ONLY
                2 - DIRECT-AND INDIRECT-FIRE WEAPONS ONLY
                3 - SUPPORT-FIRE WEAPONS ONLY
                4 - NONWEAPONS ONLY.

KFICTR                                                            C
                A CODE WORD INDICATING WHICH TYPE OF FIRE IS BEING
                CONSIDERED:
                0 - NONFIRE
                1 - DIRECT FIRE
                2 - INDIRECT FIRE
                3 - SUPPORT FIRE.

KLDPPL  (JU)                                                      OBSMINES
                NUMBER OF PERSONNEL KILLED IN UNIT K DUE TO
                MINEFIELDS WHERE K IS THE KTH HALF-WORD FROM
                KLDPPL(1).  (1<=JU<=50)

KODE                                                              T
                NOT USED

KOLDDATA(JU)                                                      OLDMVDTA
                HALFWORD PACKED ARRAY CONTAINING MOVEMENT DATA FOR
                THE JU-TH (1<=JU<=100) UNIT WHERE THE FIRST HALF
                WORD STORES THE THIRD MOVEMENT DATA VALUE (SEE
                MVDT3(JU)) OF THE JU-TH UNIT AND THE SECOND HALF
```

```
                 WORD STORES THE DISTANCE TO BE TRAVERSED ACROSS THE
                 OBSTACLE BY THE JU-TH UNIT

KONST                                                                      S
                 =10K, WHERE K IS NUMBER OF DIGITS BELOW(I.E., TO
                 RIGHT OF) NUMERICAL VALUE THAT IS TO BE STRIPPED.

KOWNT                                                                      D
                 INDEX OF FIRST WEAPON UNIT IN IW TO BE CONSIDERED
                 FOR INCLUSION IN LWPN BY WTSUB .

KPCNTRAD                                                                   PCNTRLR
                 DIO ADDRESS OF SIMULATION CONTROL SWITCH ON THE
                 PRINCIPLE CONTROLLER PANEL

KSAREA  (JENG,JCOLOR)                                                      F
                 AREA OF CLOSE-SUPPORT TARGET REGION IN THE JENG TH
                 ENGAGEMENT ; RED FIRING AGAINST BLUE REGION
                 (JCOLOR=1), BLUE FIRING AGAINST RED REGION
                 (JCOLOR=2).   (1<=JENG<=12)

KTIME                                                                      TIMES
                 THE TIME STEP NUMBER

KTIMEMAX                                                                   WORDS
                 MAX SIMULATION TIME (IN MIN RELATIVE TO 0) THAT ARE
                 SAVED IN THE RESTART AND REPLAY INFORMATION FILE.

KTR                                                                        PRINTFIR
                 NUMBER OF TARGETS FOR THE WEAPON BEING REPORTED.

L                                                                          OBCHECK
                 OBSTACLE NUMBER (1<=L<=50)
```

```
LABELCM (ICMT)                                                    CMNAME
              THE FOUR CHARACTER NAMES FOR THE ICMT-TH CLASS OF
              CONTROL MEASURE - FOR EXAMPLE LINE, AREA, ZONE,
              POSN, BASE, PNT.  (1<=ICMT<=6)

LACT                                                              UGSACT
              BIT TABLE FOR INDICATING WHETHER THE UGS FIELDS ARE
              ACTIVATED OR NOT.  THE FIRST 10 BITS ARE FOR THE
              RED UGS FIELDS. THE SECOND 10 BITS ARE FOR THE BLUE
              UGS FIELDS.

LALL     (ICOLOR)                 MKUNLIST                        HOWLIST
              UNIT NUMBER OF THE FIRST RED(ICOLOR=1) AND BLUE
              ICOLOR=2) UNITS IN THE BATTALION AND HIGHER LISTS
              ON THE MENUS AND THE STATUS REPORT.

LASTACT (ICOLOR)                                                  ACTIME
              LAST TIME UNITS WERE DEACTIVATED BY C+C MENU FOR
              RED(ICOLOR=1) AND BLUE(ICOLOR=2) FORCES

LASTTIME                                                          RUNSLOW
              IS THE TIME READ FROM THE COMPUTER CLOCK AND
              SAVED FOR COMPARISON WITH THE CURRENT TIME FROM
              THE COMPUTER CLOCK AND MNSECNDS.  (IN SECONDS)

LBATLN  (ICOLOR)                  MKUNLIST                        HOWLIST
              UNIT NUMBER OF THE FIRST RED(ICOLOR=1) AND
              BLUE(ICOLOR=2) UNITS IN THE BATTALION AND HIGHER
              LISTS ON THE MENUS

LCOMPNY (ICOLOR)                  MKUNLIST                        HOWLIST
              UNIT NUMBER OF THE FIRST RED(ICOLOR=1) AND
              BLUE(ICOLOR=2) UNITS IN THE COMPANY LISTS ON THE
              MENUS
```

```
LDET     (JU)                                                          DETECTC
                UGS DETECTION FLAG FOR UNIT JU
                 BYTE 0 =0  NO DETECTION UNIT JU BY ANY UGS FIELD
                      =1  UNIT JU WAS DETETECTED BY A UGS FIELD
                 BYTE 1,2,3 UGS FIELD NUMBERS WHICH DETECTED UNIT JU
                (1<=JU<=100)

LINE     (I)                                                           WRITLINE
                TEMPORARY 13 LINE BUFFER USED FOR ALERT MESSAGE
                PRINTING AND DEBUG PRINTING.  (1<=I<=680)

LISTUN   (IU)                     MKUNLIST                             HOWLIST
                A BYTE PACKED ARRAY OF POINTERS USED TO CONTROL THE
                ORDER WHICH UNITS ARE LISTED IN ON ALL THE MENUS AND
                THE STATUS REPORT. EACH WORD CORRESPONDS WITH A UNIT
                IU. THE WORD POINTS TO THE NEXT UNIT IN THE LIST AF-
                TER IU USING THE FOLLOWING METHOD: EACH BYTE OF THE
                WORD CONTAINS THE UNIT NUMBER OF THE NEXT UNIT IN
                THE PROPER SIZE LIST.  (1<=IU<=150)
                      0 BYTE(LEFT MOST)    PLATOON LIST
                      1 BYTE(LEFT MIDDLE) COMPANY LIST
                      2 BYTE(RIGHT MIDDLE)BATTALION AND ABOVE LIST
                      3 BYTE(RIGHT MOST)  LIST OF ALL UNITS

LLLN                              SENSINP                              VISUSER
                MAXIMUM LIGHT LEVEL (IN FOOT LAMBERTS) FOR USING
                ANY NIGHT OPTICAL DEVICE

LOOK                                                                   T
                COUNTER THAT TELLS WHETHER CHANGE-OF-STATE SELEC-
                TION TABLE IS BEING EXAMINED FOR FIRST (=1) OR
                SECOND(=2) TIME.

LOSFAKE                           NAMELIST                             DUMMYLOS
                =1  TO BYPASS TERRAIN DEPENDENT LINE OF SIGHT
                =0  TO CALCULATE LINE OF SIGHT FOR ALL UNITS
```

```
            USING TERRAIN MODEL.

LOSIND  (JU)                                                          LOSCIN
            BYTE PACKED DATA FOR EACH UNIT JU.  BYTE 0 IS A
            FLAG THAT DETERMINES WHETHER OR NOT THE UNIT HAS
            MOVED SUFFICIENTLY TO RECOMPUTE LINES OF SIGHT. IF
            BYTE 0=1, THE LINES OF SIGHT MUST BE RECOMPUTED.
            BYTES 1 AND 2 ARE NOT USED. BYTE 3 IS THE TERRAIN
            DATA GRID BLOCK NUMBER FOR THE UNIT.  (1<=JU<=100)

LOSPROB (JU,J)                                                        PROBLOS
            THE ARRAY CONTAINS THE PERCENTAGE OF UNIT K EXPOSED
            TO UNIT JU; WHERE K IS THE K TH BYTE FROM
            LOSPROB(JU,1)  (1<=JU<=100,1<=J<=25)

LOSRES                                                                RESLOS
            LINE OF SIGHT RESOLUTION INDICATOR IN MULTIPLES
            OF 25.4 METERS.  DEFAULT IS 1.

LPLTN   (N)                       MKUNLIST                            HOWLIST
            UNIT NUMBER OF THE FIRST RED(N=1) AND BLUE(N=2)
            UNITS IN THE PLATOON LISTS ON THE MENUS

LTGT    (JWTS)                                                        D
            THE JWTS-TH TARGET SUBSET (ACTUAL UNIT NUMBER).
            (1<=JWTS<=30)

LWPN    (JWTS)                                                        D
            THE JWTS-TH WEAPON SUBSET (REFLECTS THE INDEX OF
            THE WEAPON UNIT IN IW)  (1<=JWTS<=30)

LWTS                                                                  D
            INDICATOR :
            =0 IF THERE ARE MORE WEAPON-TARGET SETS TO
            BE CONSIDERED
```

```
             =1 IF THERE ARE NO MORE WEAPON-TARGET SETS TO
             BE CONSIDERED.

M                                                                OBCHECK
             TOTAL NUMBER OF TIMES A GIVEN UNIT PATH OF MOVE-
             MENT INTERSECTS THE LINE SEGMENTS COMPRISING A GIVEN
             OBSTACLE

MAXBTASK                       NAMELIST                          ENGFACT
             MAXIMUM NUMBER OF ENGINEERING TASKS PERMITTED TO
             BE CONDUCTED SIMULTANEOUSLY BY THE BLUE ARMY

MAXID    (IUT,ICOLOR)          UTINP                             C
             FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE
             (ICOLOR=2), MAXIMUM DISTANCE (IN METERS) FORWARD OF
             FRIENDLY FEBA THAT ITS INDIRECT FIRE WEAPONS WILL
             FIRE AGAINST TARGETS IN SAME ENGAGEMENT, WHEN TARGET
             UNITS ARE NOT ELIBIBLE TO RECEIVE DIRECT FIRE.
             THIS DISTANCE IS A CONSTRAINT ONLY FOR WEAPON
             UNITS AGAINST TARGET UNITS IN SAME ENGAGEMENT.
             (1<=IUT<=20)

MAXRTASK                       NAMELIST                          ENGFACT
             MAXIMUM NUMBER OF ENGINEERING TASKS PERMITTED TO
             BE CONDUCTED SIMULTANEOUSLY BY THE RED ARMY

MAXT                                                             D
             LAST TARGET UNITS - USED TO COMMUNICATE BETWEEN THE
             SUBROUTINES WTSETS AND CBTFIR.

MAXW                                                             D
             LAST WEAPONS UNIT - USED TO COMMUNICATE BETWEEN THE
             SUBROUTINES WTSETS AND CBTFIR.

MAXWRKF (IOBST)                NAMELIST                          ENGRWORK
```

```
              THE MAXIMUM NUMBER OF PERSONNEL WITHIN A UNIT THAT
              WILL BE EMPLOYED TO REDUCE AN OBSTACLE OF TYPE
              IOBST (1<=IOBST<=10)

MDCB     (I)                                                DCB17
              THE ADDRESSES WHICH CONTAINED THE I/O COMPLETION
              FOR F:17.  (1<=I<=2)

MENIN    (K,IU)                 UNINP                       MENI
              A HALFWORD PACKED ARRAY WHICH CONTAINS
              THE INITIAL AMOUNT OF THE FOUR TYPES OF PERSONNEL
              IN EACH UNIT IU (1<=K<=2,1<=IU<=100):
                  LEFT HALFWORD  (1,IU)=NO. OF CO IN UNIT IU
                  RIGHT HALFWORD (1,IU)=NO. OF OFF IN UNIT IU
                  LEFT HALFWORD  (2,IU)=NO. OF EMLDR IN UNIT IU
                  RIGHT HALFWORD (2,IU)=NO. OF EM IN UNIT IU

MENNOW   (K,IU)                 UNINP                       MENOW
              A HALFWORD PACKED ARRAY WHICH CONTAINS
              THE CURRENT AMOUNT OF THE FOUR TYPES OF PERSONNEL
              IN EACH UNIT IU (1<=K<=2,1<=IU<=100):
                  LEFT HALFWORD  (1,IU)=NO. OF CO IN UNIT IU
                  RIGHT HALFWORD (1,IU)=NO. OF OFF IN UNIT IU
                  LEFT HALFWORD  (2,IU)=NO. OF EMLDR IN UNIT IU
                  RIGHT HALFWORD (2,IU)=NO. OF EM IN UNIT IU

MFIGHT   (IUT,ICOLOR)           UTINP                       C
              FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE
              (ICOLOR=2), RANGE (IN METERS) AT WHICH A UNIT MUST
              INITIATE AN ENGAGEMENT WITH AN ENEMY UNIT.
              (1<=IUT<=20)

MHOWSEND(K)                     NAMELIST                    ALRTPROC
              BYTE-PACKED ARRAY.  BYTE I CONTROLS THE DISPOSITION
              OF ALERT MESSAGE TYPE I, AS FOLLOWS:
              0 = SEND TO CRT, WRITE ON POST-PROCESSOR FILE
              1 = SAME, BUT ONLY AFTER FIRST MINUTE OF GAME
```

```
          2 = WRITE ON FILE ONLY
          3 = IGNORE
              K=30.

MINEDATA(JMNFLD)                                                  MINES
          HALFWORD PACKED ARRAY CONTAINING DATA PERTAINING TO
          THE JMNFLD-TH (1<=JMNFLD<=20) MINEFIELD;  NOTE THAT
          THERE CAN BE AT MOST 20 MINEFIELDS IN THE MODEL;
          THE FIRST HALFWORD CONTAINS THE OBSTACLE NUMBER (AN
          INTEGER BETWEEN 1 AND 50 INCLUSIVELY) OF THE
          JMNFLD-TH MINEFIELD AND THE SECOND HALFWORD CON-
          TAINS THE NUMBER OF SECTIONS (INTEGER BETWEEN 1 AND
          3 INCLUSIVELY) MAKING UP THE JMNFLD-TH MINEFIELD

MINT                                                              D
          FIRST TARGET UNIT - USED TO COMMUNICATE BETWEEN THE
          SUBROUTINES WTSETS AND CBTFIR.

MINW                                                              D
          FIRST WEAPONS UNIT - USED TO COMMUNICATE BETWEEN THE
          SUBROUTINES WTSETS AND CBTFIR.

MMB      (JOBS)                                                   INTERSCT
          THE TOTAL NUMBER OF INTERSECTIONS BETWEEN THE UNIT
          PATH OF TRAVEL AND THE LINE SEGMENTS COMPRISING THE
          JOBS-TH OBSTACLE   (1<=MMB<=50)

MNEFLDXY(I,J,JMNFLD)                                              MINES
          HALFWORD PACKED ARRAY CONTAINING THE X AND Y COORDS.
          OF THE ENDPOINTS OF THE LINE SEGMENTS DESCRIBING THE
          JMNFLD-TH (1<=JMNFLD<=20) MINEFIELD;  SPECIFICALLY
          THE FIRST HALFWORD CONTAINS THE X COORD./4 OF THE
          ENDPOINT IN THE I-TH (1<=I<=4) SEGMENT OF THE J-TH
          (1<=J<=3) SECTION OF THE JMNFLD-TH (1<=JMNFLD<=20)
          MINEFIELD; SIMILARLY THE SECOND HALFWORD CONTAINS
          THE Y COORD./4 OF THE ENDPOINT IN THE I-TH SEGMENT
          OF THE J-TH SECTION OF THE JMNFLD-TH MINEFIELD
```

MNREDCON	NAMELIST MINIMUM READINESS CONDITION, BELOW WHICH NO FURTHER ALERTS OF REDCON CHANGE WILL BE SENT. IF SET EQUAL TO 1, NO REDCON CHANGE ALERTS WILL BE SENT TO CONTROLLERS.	REDCONS
MNRSUT	SENSINP MINIMUM TIME REQUIRED TO SET UP A GROUND SURVEILLANCE RADAR (IN MINUTES).	RADARCOM
MNSECNDS	NAMELIST MINIMUM NUMBER OF WALL CLOCK SECONDS WHICH MUST PASS FOR EACH MATH MODEL TIME STEP. IF SET EQUAL TO 60, THE SIMULATION WILL NOT RUN FASTER THAN 60 SECONDS PER ONE MATH MODEL TIME STEP (ONE SIMULATED MINUTE OF BATTLE).	RUNSLOW
MNSIZECP	THE MAXIMUM VALUE THAT ISIZE(I) MAY HAVE FOR UNIT I TO BE CONSIDERED AS A COMMAND AND CONTROL HEADQUARTERS UNIT ELIGIBLE FOR COMMUNICATIONS INTERRUPTION IF DESTROYED. SINCE ISIZE IS NEGATIVE FOR C+C UNITS MNSIZECP TURNS OUT TO BE NEGATIVE OF THE MINIMUM SIZE CLASS UNIT WHICH IS TO BE CONSIDERED. FOR EXAMPLE, -5 MEANS CONSIDER ONLY BATTALION AND HIGHER UNITS WHICH ARE ALSO CPS.	CPDEAD
MODCTR	MODE OF FIRE .	P
MODE	MODE OF FIRE BEING COMPUTED(RANGES FROM 1 TO 8)	FIRORG
MOFNAME (I,IOBS)		OBSDATA

ALPHANUMERIC NAME OF THE IOBS-TH (1<=IOBS<=50)
OBSTACLE EACH NAME IS STORED IN AT MOST THREE FULL
WORDS (1<=I<=3)

MOUNTED — MOUNTCOM

BIT-PACKED ARRAY GIVING MOUNTED/DISMOUNTED STATUS OF
EACH UNIT. ZERO MEANS MOUNTED, ONE MEANS DISMOUNTED

MOUNTOLD — MOUNTCOM

BIT-PACKED ARRAY GIVING MOUNTED/DISMOUNTED STATUS
OF EACH UNIT DURING LAST PREVIOUS TIME STEP.
ZERO IF MOUNTED. ONE IF DISMOUNTED.

MOVECC (JU) — MNVRCC

INDICATOR OF INTERACTIVE MOVEMENT CMD. AND CONTROL
(1<=JU<=100)
=0 UNIT IS NOT UNDER INTERACTIVE CONTROL
=1 UNIT IS UNDER INTERACTIVE CONTROL(MOUNTED)
=2 UNIT IS UNDER INTERACTIVE CONTROL(DISMOUNTED)

MOVEDEGR — DGRONOFF

FLAG INDICATING WHETHER MOVEMENT DEGRADATION EFFECTS
SHOULD BE CONSIDERED IN MOVEMENT WHERE:
= 0 CONSIDER DEGRADATION EFFECTS
= 1 IGNORE DEGRADATION EFFECTS

MSA — WORDS

NUMBER OF MATH MODEL MINUTES THAT CAN BE SAVED ON
REPLAY INFORMATION FILE (PARTLY USED FOR RESTART).-
F:30, F:31, F:32, F:33.

MSEG (I,JOBS) — MSEGMT

A BYTE PACKED ARRAY CONTAINING THE SEGMENT NUMBER
OF THE JOBS-TH (1<=JOBS<=50) OBSTACLE ON WHICH THE
K-TH (1<=K<=12) INTERSECTION WITH A GIVEN UNIT PATH
OF TRAVEL OCCURS; WHERE K DENOTES THE K-TH BYTE

```
              FROM MSEG(1,JOBS);  THE THREE WORDS OF MSEG(I,JOBS)
              (1<=I<=3) CONTAIN THE 12 BYTES SPECIFIED BY K

MSEGMENT                                                            ODIST
              THE SEGMENT NUMBER OF A GIVEN OBSTACLE CONTAINING
              THE POINT OF OBSTRUCTION SUFFERED BY A GIVEN UNIT

MSIZE   (IU)                     UNINP                              TARGETS
              SIZE OF UNIT IU (LIKE ISIZE WAS INTENDED TO BE).
              SHOULD REFLECT THE ACTUAL NUMBER OF PERSONNEL
              IN THE UNIT.  (1<=IU<=100)
               1 = SQUAD
               2 = SECTION
               3 = PLATOON
               4 = COMPANY/BATTERY/TROOP
               5 = BATTALION
               6 = REGIMENT
               7 = BRIGADE
               8 = DIVISION

MSR                                                                 WORDS
              NUMBER OF TIME INTERVALS THAT CAN BE SAVED ON
              RESTART INFORMATION FILE(F:20)
              SEE INTSAVE.  MSR EXAMPLE:  IF MSR=5 AND INTSAVE
              =15, THE SIMULATION COULD BE RESTARTED TO THE FIRST
              FIVE 15 MINUTE INTERVALS (TIMES 0, 15, 30, 45,
              AND 60).

MSRVIOL (I)                                                         FIREMSP
              A LIST OF UP TO 10 FIRE CONTROL MEASURES VIOLATED
              BY A SINGLE SUPPORT FIRE UNIT FIRING AT A SINGLE
              TARGET.  THIS LIST IS THE OUTPUT OF CK4XING RESULT-
              ING FROM A CALL BY SUBROUTINE SPTALO.  (1<=I<=10)

MTASEED                          NAMELIST                           MAINTATR
              THE SEED USED IN THE RANDOM NUMBER GENERATOR TO
              GENERATE RANDOM NUMBERS FOR THE MAINTENANCE
```

```
                 ATTRITION MODULE.

MTCDOG  (IOPG)                       OGINP                         G
                 MOVEMENT CODE OF THE IOPG-TH OPERATIONAL GROUPING;
                 SEE MOVEMENT CODES FOR UNIT MVTCD(IOPG)
                 (1<=IOPG<=20)

MTYPOFCM(I)                                                        CMNAME
                 A BYTE-PACKED ARRAY.  BYTE J GIVES THE BACKGROUND
                 INDEX FOR THE CONTROL MEASURE TYPE WHICH HAS
                 FOREGROUND INDEX J.  (1<=I<=35)

MURNGE                                                             P
                 DISTANCE (IN METERS) FROM UNIT I TO UNIT II

MURTAB  (INMODE,J)                   MUINP                         C
                 REPRESENTS THE TWO BREAK RANGES (IN METERS) AND
                 THREE MODE DISTRIBUTION VECTOR NUMBERS CORRESPONDING
                 TO EACH MODE SELECTION CODE INMODE USED TO SELECT
                 MODE DISTRIBUTION VECTORS AS FUNCTION OF RANGE.
                 (1<=INMODE<=150,1<=J<=5)

MUSLCT  (INMODE)                     MUINP                         C
                 MODE SELECTION CODES IN THE FORM WWXXYYZZ.
                 SUCH THAT
                 WW = WEAPON UNIT STATE
                 XX = TARGET UNIT STATE ( = 99 FOR NO TARGET)
                 YY = TARGET UNIT TYPE ( = 99 FOR NO TARGET)
                 ZZ = EQUIPMENT TYPE. (=99 FOR SUPPORT FIRE WEAPON)
                 00 IN ANY POSITION MEANS EQUALITY OF LOOKUP VALUE.
                 EQUALITY MEANS USE MURTAB(INMODE,J) (J=1,5) TO
                 SELECT MODE DISTRIBUTION VECTOR  (1<=INMODE<=150)

MUSLRA  (JU)                                                       BLEFT2
                 DISTANCE (IN METERS) OF UNIT JU TO ENEMY FEBA OR
                 NEAREST ENEMY UNIT; USED TO SELECT PROPER MODE DIS-
```

```
            TRIBUTION VECTOR   (1<=JU<=100)
            FOR NONWEAPONS, DIRECT AND INDIRECT FIRE WEAPONS,
            THIS VARIABLE IS SET FOR UNIT I BASED ON THE
            FOLLOWING CONDITIONS:
            IF: I IS ENGAGED AND EXCHANGING DIRECT OR INDIRECT
                FIRE WITH ENEMY UNITS, THEN MUSLRA=THE DISTANCE
                TO ENEMY FEBA OR DISTANCE TO THE NEAREST ENEMY
                UNIT AT WHICH I MAY FIRE, WHICHEVER IS LESS.
            IF: I IS NOT ENGAGED, BUT IS EXCHANGING DIRECT
                OR INDIRECT FIRE WITH ENEMY UNITS, THEN
                MUSLRA=THE DISTANCE TO THE NEAREST ENEMY
                UNIT AT WHICH I MAY FIRE.
            IF: I IS ENGAGED, BUT IS NOT WITHIN FIRING RANGE OF
                ENEMY UNITS, THEN MUSLRA=THE DISTANCE TO THE
                ENEMY FEBA.
            IF: I IS NOT ENGAGED AND IS NOT WITHIN FIRING
                RANGE OF ENEMY UNITS, THEN MUSLRA IS INFINITE
                (I.E., GREATER THAN THE SECOND BREAK RANGE).

MVCHG1  (I,J)                     MOVINP                        R
            I TH ENTRY IN MOVEMENT CODE CHANGE TABLE FOR CHANGES
            IN MOVEMENT CODE OF UNITS.  EACH ENTRY IS OF THE
            FORM UVVWXXYY , WHERE
             0 IN ANY POSITION MEANS EQUALITY OF LOOK UP.
             IF YY=99 , UNIT CAN BE IN AN OPERATIONAL GROUPING
                MVCHG1 (I,1) = UUVVW
                MVCHG1 (I,2) = XXYYZZ
                (1<=I<=90)
              SUCH THAT
               UU = UNIT TYPE
               VV = OPERATIONAL STATE OF UNIT
               W  = 1 OR 2 (RED OR BLUE)
               XX = CURRENT MOVEMENT CODE
               YY = OPERATIONAL GROUPING
               ZZ = UNIT NUMBER.
            EQUALITY OF LOOK UP MEANS USE MVCHG2(I) TO FIND
            NEW DATA FOR UNIT.  (1<=J<=2)

MVCHG2  (I)                       MOVINP                        R
            THIS TABLE HAS AN ENTRY CORRESPONDING TO EACH ENTRY
```

```
                 I IN THE MOVEMENT CODE CHANGE TABLE.  TABLE MVCHG1.
                 ENTRIES IN MVCHG2 GIVE NEW UNIT DATA, AND
                 ARE OF THE FORM EEFGJJKKK, WHERE
                     MVGCHG2(I)=EEFGJJKKK
                 SUCH THAT
                     EF = NEW MOVEMENT CODE OF UNIT
                      F = NEW TRAVEL CODE
                      G = NEW DEPLOYMENT CODE (0=> NOT USED)
                     JJ = NEW OPERATIONAL STATE (0=> NO CHANGE)
                    KKK = LINE NUMBER IN MOVEMENT DATA
                          TABLE (MVDATA) ASSOCIATED WITH
                          NEW MOVEMENT CODE.
                 (1<=I<=90)

MVCHG3  (I,J)                      MOVINP                          R
                 OPERATIONAL STATE UPDATING TABLE WHICH CONTAINS
                 CODE WORDS SPECIFYING CHANGES IN UNIT STATE
                 AND TRAVEL CODE WHEN UNIT MOVEMENT CODE HAS
                 BEEN CHANGED BY SOME MEANS OTHER THAN THROUGH
                 THE USE OF MVCHG1. CODE WORDS ARE OF THE FORM
                  TTUUVWWXXZZ    WHERE
                  MVCHG3 (I,1) = TTUUV
                  MVCHG3 (I,2) = WWXXZZ
                  (1<=I<=30)
                 SUCH THAT
                  TT = UNIT NUMBER
                  UU = UNIT TYPE
                   V = 1 OR 2 (RED OR BLUE)
                  WW = OPERATIONAL GROUPING NUMBER OF UNIT
                  XX = MOVEMENT CODE OF UNIT (RECENTLY CHANGED)
                  ZZ = NEW OPERATIONAL STATE OF UNIT.
                   0 IN ANY POSITION MEANS EQUALITY OF LOOK-UP.
                   IF WW =99 , ANY UNIT NOT IN ANY OPERATIONAL GROUP.
                 (1<=J<=2)

MVDATA  (I)                        MOVINP                          R
                 MOVEMENT DATA TABLE REFERRED TO BY MVCHG2
                 (1<=I<=100)
```

```
MVDTA1   (IOPG)                          OGINP                          G
              MOVEMENT DATA SET 1 OF THE IOPG-TH OPERATIONAL
              GROUPING  (1<=IOPG<=20)

MVDTA2   (IOPG)                          OGINP                          G
              MOVEMENT DATA SET 2 OF THE IOPG-TH OPERATIONAL
              GROUPING  (1<=IOPG<=20)

MVDTA3   (IOPG)                          OGINP                          G
              MOVEMENT DATA SET 3 OF THE IOPG-TH OPERATIONAL
              GROUPING  (1<=IOPG<=20)

MVDT1    (IU)                            UNINP                          BLEFT2
              MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVDT2    (IU)                            UNINP                          BLEFT2
              MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVDT3    (IU)                            UNINP                          BLEFT2
              MOVEMENT DATA FOR UNIT IU  (1<=IU<=100)

MVTCD    (IU)                            UNINP                          BLEFT2
              MOVEMENT CODE OF UNIT IU (1<=IU<=100):
              1-NORMALLY ENGAGED
              2-WITHDRAWING
              3-DEPLOYING(NOT IN POSITION)
              4-DEPLOYED(IN POSITION WAITING
                FOR OTHER UNITS)
              5-MOVING IN FIXED DIRECTION
              6-MOVING ALONG ROUTE
              7-HALTED
              8-MOVING TOWARD FIXED POINT
              9-MOVING TOWARD POINT RELATIVE TO FRIENDLY
                OPERATIONAL GROUPING
              10-MOVING TOWARD POINT RELATIVE TO ENEMY
                OPERATIONAL GROUPING
```

```
                   11-MOVING TOWARD POINT RELATIVE TO FRIENDLY
                     ENGAGEMENT FEBA
                   12-MOVING TOWARD POINT RELATIVE TO ENEMY
                      ENGAGEMENT FEBA
                   13-MOVING TOWARD POINT RELATIVE TO FRIENDLY
                      UNIT
                   14-MOVING TOWARD POINT RELATIVE TO ENEMY UNIT
                   15-DEPLOYING WHILE NOT ENGAGED(NOT IN POSITION)
                   16-DEPLOYED WHILE NOT ENGAGED (IN POSITION
                      WAITING FOR OTHER UNITS).

MXRDIST                                  NAMELIST                        ROADIST
                   MAXIMUM DISTANCE (IN METERS) AWAY FROM NEAREST ROAD
                   SEGMENT BEFORE A UNIT IS CONSIDERED OFF ROAD

NAIRPTS (JAU)                                                            AIRLOC
                   NUMBER OF POINTS CALCULATED FOR AIR UNIT JAU DURING
                   THIS MINUTE.  (1<=JAU<=10)

NAMECM  (J,ICMT)                                                         CMNAME
                   THE 12 CHAR. NAME(J=1,3) FOR THE ICMT-TH CONTROL
                   MEASURE TYPE, WHERE THE INDEXING SCHEME IS THE
                   BACKGROUND SCHEME.  (1<=ICMT<=40)

NAMEPLAN(I,IPPM)                         PPLANINP                        PPLANAME
                   NAME ASSOCIATED WITH PRE-PLAN MISSION NO. IPPM.
                   8 CHARACTERS EACH (1<=I<=8,1<=IPPM<=10)

NAMOU   (IU)                             UNINP                           BOBBY
                   NUMBER OF AMMUNITION TYPES IN UNIT IU (1<=IU<=100)

NBENGR                                                                   ENGUNIT
                   TOTAL NUMBER OF ACTIVE ENGINEERING SUPPORT UNITS
                   WITHIN THE BLUE ARMY AT THE CURRENT TIME
```

```
NBKMOV   (I)                     COSINP                         D
               THE NUMBER OF FIRST(I=1) OR LAST(I=2) BACKWARD-
               MOVING OPERATIONAL STATE

NBRIDGE                          ROADINP                        BRIDGES
               NUMBER OF INPUT BRIDGES (MAX OF 16)

NCBOG    (JENG)                                                 F
               FOR THE JENG-TH ENGAGEMENT, NUMBER OF CONTROLLING
               BLUE OPERATIONAL GROUPING (ZERO IF NONE)
               (1<=JENG<=12)

NCC                                                             FIROVRD
               NUMBER OF ENTRIES CURRENTLY IN IFIROVRD TABLE

NCDDP    (IRTE)                  MOVINP                         H
               NUMBER OF POINTS DESCRIBING THE IRTE-TH ROUTE THAT
               UNITS MAY BE REQUIRED TO FOLLOW.  (1<=IRTE<=50)
               ALWAYS INITIALIZE NCDDP=0 ON THE DATABASE.

NCIR                                                            WEATHR
               NUMBER OF LOCAL WEATHER AREAS

NCRIT                                                           T
               NUMBER OF CHANGE-OF-STATE CRITERION TO BE USED.

NCROG    (JENG)                                                 F
               FOR THE JENG-TH ENGAGEMENT, NUMBER OF CONTROLLING
               RED OPERATIONAL GROUPING (ZERO IF NONE)
               (1<=JENG<=12)

NCURV                            TAINP                          D
               THE TOTAL NUMBER OF PRTB CURVES BEING USED.
               NOT USED IN CATTS.
```

```
NDAYE                          NAMELIST                          ETIME
          CALENDAR DATE OF FIRST DAY OF SIMULATION.  THE
          LOWEST NUMBERED NDAYE FOR A SET OF EXERCISES
          SHOULD BE USED AS THE FIRST DAY OF THE SET, AND
          BE USED TO SET NDAYEMN1.

NDAYEMN1                       NAMELIST                          DAYLESS1
          USED TO INDEX INTO WEATHER ARRAY WDAY. THUS IF
          3 JUNE IS THE FIRST DAY OF A SET OF EXERCISES,
          NDAYEMN1 SHOULD BE EQUAL TO 2 SO THAT NDAYE-NDAYEMN1
          =1 (1ST ARRAY ELEMENT OF WDAY).

NDCVAL                         COSINP                            T
          TOTAL NUMBER OF DATA VALUES,DECVAL,TO BE USED WITH
          THE CRITERIA IN THE CHANGE-OF-STATE SELECTION TABLE.

NDISPR                         WEFINP                            P
          NUMBER OF ENTRIES IN IDISPR LIST.

NDXEQ    (JEQ,JCOLOR)                                            STATINDX
          INDEX NUMBER FOR ARRAY STATS FOR EQUIPMENT NUMBER
          JEQ(JEQ=1,80), COLOR JCOLOR(1=RED,2=BLUE)

NDXSTATS(JEQ,JCOLOR)                                             STATINDX
          EQUIPMENT NUMBER OF THE JEQ TH EQUIPMENT(JEQ=1,40)
          IN THE STATS ARRAY FOR COLOR JCOLOR(1=RED, 2=BLUE)

NEQUIP                         MISCVAR                           FORBLK
          NUMBER OF EQUIPMENT TYPES MODELED;MAX IS 80

NETAMU  (IU,J)                 UNINP                             BOBBY
          CURRENT AMOUNT IN TENTHS OF A ROUND, OF J-TH
          AMMO TYPE CARRIED BY UNIT IU.  ACTUAL AMMO TYPE
```

```
                    GIVEN BY NTAMU(IU,J).  (1<=IU<=100,1<=J<=14)

NETAMX  (JU,J)                                                        BOBBY
                    INITIAL AMOUNT IN TENTHS OF A ROUND, OF J-TH
                    AMMO TYPE CARRIED BY UNIT JU.  ACTUAL AMMO TYPE
                    GIVEN BY NTAMU(IU,J).  (1<=JU<=100,1<=J<=14)

NETU    (IU)                            UNINP                         BOBBY
                    NUMBER OF EQUIPMENT TYPES IN UNIT IU (1<=IU<=100)

NEWS                                                                  T
                    COUNTER THAT = 1 IF CHANGE-OF-STATE CRITERION IS
                                   NOT SATISFIED
                                 = 2 IF CRITERION IS SATISFIED.

NEWVDT                                  MOVINP                        R
                    NUMBER OF ENTRIES IN MVDATA TABLES (<=100)

NEXTACP (JAU)                                                         AIROUTES
                    INDEX WITHIN /AIROUTES/ ARRAYS OF NEXT CHECK POINT
                    FOR AIR UNIT JAU (1<=JAU<=10).

NEXTB                                   MOVINP                        R
                    NUMBER OF ENTRIES IN IEXTBL TABLE (<=15). IF EQUAL
                    ZERO, THERE ARE NO ENTRIES IN TABLE, AND FECFAC = 1.
                    FOR ALL OPERATIONAL GROUPINGS.

NEXTEV                                                                EVINDT
                    ENTRY NUMBER(RECORD NUMBER) OF EVENT THAT IS TO
                    OCCUR NEXT

NFC                                     WEFINP                        P
                    NUMBER OF ENTRIES IN WEAPON EFFECTS LOOK UP  TABLE
```

```
NFDU                              NAMELIST                              AIRU
          NUMBER OF FIRST DUMMY UNIT.  (DUMMY UNITS INCLUDE
          AIR UNITS USED TO INDEX AIR UNIT ARRAYS).  AIR
          UNIT INDEX FOR UNIT I IS I+1-NFDU.

NFFLG    (JU)                                                           DETFIRE
          FIRING ARRAY - USING FOR DETECTION SUBROUTINE
          THE K TH BIT FROM NFFLG(1) INDICATES WHETHER THE K
          TH UNIT IS FIRING OR NOT (=1 FOR FIRING) (1<=JU<=4)

NFIELD                                                                  MINES
          TOTAL NUMBER OF MINEFIELDS IN THE MODEL;  THIS
          NUMBER CAN NOT EXCEED 20

NFILTER                                                                 AUDFLTR
          SUBROUTINE SAVE DEBUG PRINT CONTROL.
          = 51 MEANS GET DEBUG PRINTOUT.
          <51 OR >51 MEANS NO PRINTOUT.
          ALSO, THIS IS THE NUMBER OF TIMES THE FOREGROUND
          MUST SUCCESSIVELY READ A TIME FROM THE AUDIO TAPE
          BEFORE IT CONSIDERS THE TIME (MINUTE) TO HAVE
          CHANGED.  (NOW SET AT 50).

NFSTAB                            FSINP                                 U
          NUMBER OF PAIRS OF ENTRIES IN FIRE-SUPPORT ALLOCA-
          TION TABLE (IFSTAB).

NGARNG  (IUT,ICOLOR)              UTINP                                 C
          FOR EACH UNIT TYPE IUT, RED(ICOLOR=1) OR BLUE
          (ICOLOR=2), RANGE AT WHICH A UNIT IS ELIGIBLE TO
          INITIATE AN ENGAGEMENT WITH AN ENEMY UNIT.
          (1<=IUT<=20)

NGSR                              SENSINP                               RADARCOM
          NUMBER OF GROUND SURVEILLANCE RADARS IN THE MODEL
```

NHOURE	NAMELIST NUMBER OF ELAPSED HOURS SINCE MIDNIGHT (0-23)	ETIME
NIMFIRES	SIZE OF IXYIM ARRAY	IMPACT
NINF	SENSINP THE SCOUT UNIT TYPE NUMBER	VISUSER
NLASTE	ENTRY NUMBER(RECORD NUMBER) OF LAST DISK I/O TO BACK-GROUND EVENT FILE.	EVINDT
NLDU	NAMELIST NUMBER OF LAST DUMMY UNIT. (DUMMY UNITS INCLUDE AIR UNITS.) NLDU MINUS NFDU MUST BE LESS THAN 10.	AIRU
NLTG	NUMBER OF ENTRIES IN LTGT LIST	D
NLWP	NUMBER OF ENTRIES IN LWPN LIST	D
NMINE	NAMELIST NUMBER OF ELAPSED MINUTES (0-59)	ETIME
NMODES	MISCVAR MAXIMUM NUMBER OF MODES OF OPERATION ASSIGNED FOR ANY EQUIPMENT CLASS (OTHER THAN FIRE SUPPORT WEAPONS).	FORBLK

```
NMPN     (JAU)                                                   WPNUMBR
            THE ORDNANCE TYPE BEING DELIVERED BY AIR UNIT
            JAU (JAU=1,10)

NMU                              MUINP                           C
            NUMBER OF MODE DISTRIBUTION VECTORS.

NMVCH1                           MOVINP                          R
            NUMBER OF ENTRIES IN MVCHG1 TABLES (<=90)

NMVCH3                           MOVINP                          R
            NUMBER OF ENTRIES IN MVCHG3 TABLES (<=20)

NNGAGE                           ENGINP                          F
            NUMBER OF ENGAGEMENTS ESTABLISHED

NOAIM                                                            MSCLAN
            FLAG USED FOR WEAPONS EFFECTS FUNCTION 2

NOALERTS                         NAMELIST                        ALRTFLG
            ALERT MESSAGES SEND/PRINT CONTROL FLAG
            =0  SEND ALERT MESSAGES TO SUPERBEES ONLY
            =1  DO NOT SEND OR WRITE TO DISK FILE
            =2  SEND TO SUPERBEES AND WRITE TO DISK FILE
            =3  WRITE TO DISK FILE ONLY
            RUN POST PROCESSOR PROGRAM AFTER GAME TERMINATES TO
            PRINT ALERT MESSAGES ONTO LINE PRINTER.

NOALL    (ICOLOR)                MKUNLIST                        HOWLIST
            NUMBER OF UNITS IN THE RED(ICOLOR=1) AND BLUE
            (ICOLOR=2) LISTS OF ALL THE UNITS

NOB                              OBFMINP                         OBSDATA
            TOTAL NUMBER OF OBSTACLES CURRENTLY IN THE MODEL
```

```
              MAXIMUM NUMBER OF OBSTACLES CANNOT EXCEED FIFTY

NOBATLN (ICOLOR)                  MKUNLIST                        HOWLIST
              NUMBER OF UNITS IN THE RED(ICOLOR=1) AND BLUE
              (ICOLOR=2) LISTS OF BATTALIONS

NOCMT                             CMINP                           CM
              HIGHEST VALUE OF I FOR WHICH ICM(1,1) IS NONZERO;
              THAT IS, NUMBER OF CONTROL MEASURES IN TABLE.

NOCOMPNY(ICOLOR)                  MKUNLIST                        HOWLIST
              NUMBER OF UNITS IN THE RED(ICOLOR=1) AND BLUE
              (ICOLOR=2) LISTS OF COMPANIES

NODEADCP                          NAMELIST                        CPDEAD
              THE NUMBER OF MINUTES THAT COMMUNICATION IS LOST
              WITH DISABLED COMMAND AND CONTROL HEADQUARTERS UNITS
              IF SET =0, THE DEAD CP LOGIC IS SKIPPED, AND
              NO LOSS OF COMMUNICATION DUE TO DISABLED HQ WILL
              EVER OCCUR.

NODETECT                                                          AIRDEFNS
              = .TRUE. IF AIR UNIT WAS NOT DETECTED AT ANY POINT
              IN THIS QUARTER MINUTE;  = .FALSE. OTHERWISE.

NOG                               OGINP                           G
              NUMBER OF OPERATIONAL GROUPINGS.  SHOULD =20.

NOPLTN  (ICOLOR)                  MKUNLIST                        HOWLIST
              NUMBER OF UNITS IN THE RED(ICOLOR=1) AND BLUE
              (ICOLOR=2) LISTS OF PLATOONS

NOPTB                             COSINP                          T
              NUMBER OF ENTRIES IN CHANGE-OF-STATE SELECTION TABLE
```

```
NOUAS    (ICOLOR)              SENSINP                UASF
            TOTAL NUMBER OF UGS FIELDS FOR:
             ICOLOR=1  RED FORCE
             ICOLOR=2  BLUE FORCE

NOWFLG   (I,JU,K)                                     FIRALRT
            RECEIVING FIRE INDICATOR TABLE FOR CURRENT TIME STEP
            NOWFLG IS A BIT TABLE INDEXED.
            NOWFLG IS INTERPRETED SIMILARLY TO OLDFLG.
            (1<=I<=3,1<=JU<=100,1<=K<=4)

NPFC                           WEFINP                 P
            NUMBER OF ENTRIES IN WEAPON EFFECTS TABLE
            INVOLVING PERSONNEL TARGETS.

NPFP1                                                 P
            NPFC + 1

NPPM                           PPLANINP               PPLANAME
            TOTAL NO. OF PRE-PLANNED MISSIONS DEFINED

NPPREC   (IPPM)                PPLANINP               PPLANREC
            NUMBER OF EVENT NOTICES (=NO. OF DISK RECORDS)
            COMPRISING PRE-PLANNED MISSION IPPM (1<=IPPM<=10)

NPRWT                          MISCVAR                FCRBLK
            MAXIMUM NUMBER OF PRIORITY WEAPON TYPES
            ALLOWED FOR ANY PARTICULAR UNIT TYPE MUST BE
            <= 40.

NPTE     (IEQ,J)               EQINP                  A2
            EQUIPMENT NUMBERS OF THREE PRIMARY TARGET
            TYPES FOR WEAPON IEQ; -1 IMPLIES A PERSONNEL
```

```
              TARGET.   (1<=IEQ<=80,1<=J<=3)
              FOR AIR ORDNANCE, THIS VARIABLE CONTAINS THE
              RELATIVE PRIORITY (THE ORDNANCE WITH THE
              HIGHEST NUMBER FOR PRIORITY IS USED AGAINST
              A TARGET WHEN THERE IS A CHOICE OF
              ORDNANCE). THE ELEMENTS CONTAIN THE PRIORITIES
              AS FOLLOWS:
              J=1 FOR ORDNANCE VS UNIT CLASS 1 - NOT ARMORED
              J=2 FOR ORDNANCE VS UNIT CLASS 2 - LIGHT ARMOR
              J=3 FOR ORDNANCE VS UNIT CLASS 3 - HEAVILY ARMORED
                SEE IAIRVUL.

NPVC                              MISCVAR                        FORBLK
              NUMBER OF PERSONNEL VULNERABILITY CLASSES.

NPVUL                                                            P
              VULNERABILITY CLASS OF PERSONNEL TARGET ELEMENT .

NP1                                                              AIRDEFNS
              INDEX TO FIRST POINT IN /AIRLOC/ ARRAYS FOR THIS
              QUARTER MINUTE.

NP2                                                              AIRDEFNS
              INDEX TO LAST POINT IN /AIRLOC/ ARRAYS FOR THIS
              QUARTER MINUTE.

NQPTOT  (JCOLOR)                                                 STATINDX
              NUMBER OF EQUIPMENT TYPES FOR ALL RED(JCOLOR=1),
              AND BLUE(JCOLOR=2) UNITS USED FOR STATS ARRAYS.

NRENGR                                                           ENGUNIT
              TOTAL NUMBER OF ACTIVE ENGINEERING SUPPORT UNITS
              WITHIN THE RED ARMY AT THE CURRENT TIME

NRMU                              MUNINP                         C
```

	NUMBER OF MODE SELECTION CODES		
NROADS	NUMBER OF ROADS INPUT	ROADINP	ROADS
NROG	NUMBER OF RED OPERATIONAL GROUPINGS : THESE ARE LISTED BEFORE BLUE	OGINP	G
NROGP1	NUMBER OF FIRST BLUE OPERATIONAL GROUPING.	OGINP	G
NRTGTS (IUSZ)	THE NOMINAL NUMBER OF RADAR TARGETS IN A UNIT OF SIZE IUSZ (1<=IUSZ<=20)	SENSINP	TARGETS
NRU	NUMBER OF RED UNITS (PRECED BLUE UNITS).	NAMELIST MISCVAR	FORBLK
NRUP1	NUMBER OF FIRST BLUE UNIT (>NLDU).	NAMELIST	FORBLK
NSEG	A COUNTER KEEPING TRACK OF THE NUMBER OF LINE SEGMENTS OF A GIVEN OBSTACLE BEING CHECKED FOR INTERSECTIONS WITH THE LINE DESCRIBING THE UNIT PATH OF MOVEMENT DURING THE CURRENT TIME STEP		MSEGMT
NSEGMT (IOBS)	THE NUMBER OF LINE SEGMENTS COMPRISING THE IOBS-TH (1<=IOBS<=50) OBSTACLE	OBFMINP	OBSDATA
NSGSLT		SIGINP	Q

```
                  NUMBER OF ENTRIES IN SUPPRESSION CRITERION
                  SELECTION TABLE (S<=40).

NSGSOR                                                              Q
                  NUMBER OF ENTRIES IN SORTED PORTION OF SUPPRESSION
                  CRITERIA SELECTION TABLE .

NSGTAB                                  SIGINP                      Q
                  NUMBER OF SUPPRESSION CURVES  (<=10) .

NSPTHR   (I)                            COSINP                      D
                  I =1 IS NUMBER OF THE FIRST OPERATIONAL STATE
                  IN WHICH A TARGET IS CONSIDERED A SPECIAL THREAT.
                  I =2 IS NUMBER OF THE LAST SUCH OPERATIONAL
                  STATE. ALL OPERATIONAL STATE NUMBERS IN BETWEEN
                  ARE ALSO CONSIDERED SPECIAL THREAT.

NSPVP1                                  FSINP                       U
                  FIRST ENTRY IN WEAPON EFFECTS LOOK-UP TABLE PER-
                  TAINING TO SUPPORT FIRE VERSUS PERSONNEL.

NSPVP2                                  FSINP                       U
                  LAST SUCH ENTRY IN TABLE.  SEE NSPVP1.

NSTE     (IEQ,J)                        EQINP                       A2
                  EQUIPMENT NUMBERS OF THREE SECONDARY TARGET TYPES
                  FOR WEAPON IEQ; -1 IMPLIES A PERSONNEL TARGET.
                  (1<=IEQ<=80,1<=J<=3)
                  FOR AIR ORDNANCE, THIS VARIABLE CONTAINS THE
                  RELATIVE PRIORITY (THE ORDNANCE WITH THE
                  HIGHEST NUMBER FOR PRIORITY IS USED AGAINST
                  A TARGET WHEN THERE IS A CHOICE OF
                  ORDNANCE).  THE ELEMENTS CONTAIN THE PRIORITIES
                  AS FOLLOWS:
                  J=1 FOR ORDNANCE VS X,Y POINT
                  J=2 FOR ORDNANCE VS ROAD
```

```
            J=3 FOR ORDNANCE VS BRIDGE
               (SEE ALSO NPTE(IEQ,J))

NT                                                              D
            NUMBER OF ENTRIES IN TARGET-UNIT SET

NTAMU    (IU,J)                      UNINP                      BOBBY
            AMMUNITION TYPE NUMBER OF J-TH AMMO TYPE CARRIED
            BY UNIT IU.   (1<=IU<=100,1<=J<=14)

NTEST                                                           T
            INDEX NUMBER OF VALUE TO BE USED FROM DATA VALUE
            TABLE, DECVAL.

NTGTPT  (JAU)                                                   AIROUTES
            INDEX WITHIN /AIROUTES/ ARRAYS OF TARGET POINT
            NUMBER FOR AIR UNIT JAU.   =0 IF NO TARGET
            (RECON MISSION).   (1<=JAU<=10)

NTGTYP  (JAU)                                                   AIROUTES
            TYPE OF TARGET FOR AIR UNIT JAU.   = GROUND UNIT
            NUMBER OR CODE FOR ROAD, BRIDGE, OR X-Y POINT.
            (1<=JAU<=10)

NTPEQDST(JU)                                                    OBSMINES
            EQUIPMENT CLASS DESTROYED IN UNIT K BY MINEFIELD
            WHERE K IS THE KTH BYTE FROM NTPEQDST(1)
            (1<=JU<=25)

NUMAMO                               AMMOINP                    AMMONAM
            NUMBER OF THE HIGHEST NUMBERED AMMUNITION TYPE
            MODELED.

NUMCNTRL                             NAMELIST                   PCNTRLR
```

```
                STATION NUMBER OF PRINCIPAL CONTROLLER (=1,2,OR 3)

NUMSEG                                                          JTRAP
                SEGMENT NUMBER OF THE MATH MODEL OVERLAY
                SEGMENT LAST LOADED

NUNIT                            MISCVAR                        FORBLK
                TOTAL NUMBER OF UNITS (RED AND BLUE).  MUST BE=<99.

NUNTYP                           MISCVAR                        FORBLK
                NUMBER OF UNIT TYPES.  MUST BE =<20.

NW                                                              D
                NUMBER OF ENTRIES IN WEAPON-UNIT SET.

NWORD1                                                          WORDS
                NUMBER OF WORDS CONTAINED IN FIRST PART OF COMMON
                SAVES (ROOT).

NWORD2                                                          WORDS
                NUMBER OF WORDS CONTAINED IN SECOND PART OF COMMON
                SAVES.(ROOT).

NWORD3                                                          WORDS
                NUMBER OF WORDS CONTAINED IN THIRD PART OF COMMON
                SAVES (SEGMENT ONE)

NWORD4                                                          WORDS
                NUMBER OF WORDS CONTAINED IN FOURTH PART OF COMMON
                SAVES (SEGMENT TWO)

NWORD5                                                          WORDS
                NUMBER OF WORDS CONTAINED IN FIFTH PART OF COMMON
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                SAVES (SEGMENT THREE)

NXHGCM   (IU)                      MKUNLIST                         NEXTCOMM
                THE UNIT NUMBER OF THE UNIT WHICH IS NEXT
                HIGHER COMMAND FOR UNIT IU(IU=1,150)

NXK                                WEFINP                           P
                NUMBER OF GROUPINGS OF CONSTANTS, EFFDAT, USED
                IN WEAPON EFFECTS COMPUTATIONS.

OBSDEL   (IU)                      UNINP                            BLEFT2
                OBSTACLE DELAY COUNTER FOR UNIT IU  (1<=IU<=100)
                FOR AIR UNITS, THE TIME IN MINUTES FROM
                FIRST CHECK POINT TILL LANDING.

OLDFLG   (I,JU,K)                                                   FIRALRT
                RECEIVING FIRE INDICATOR TABLE FOR LAST TIME STEP:
                OLDFLG IS A BIT TABLE:
                FIRST SUBSCRIPT = TYPE OF FIRE
                         1 = DIRECT FIRE (SMALL ARMS)
                         2 = INDIRECT FIRE (MORTARS)
                         3 = SUPPORT FIRE (ARTILLERY)
                SECOND SUBSCRIPT = UNIT NUMBER OF UNIT RECEIVING
                         FIRE
                THIRD SUBSCRIPT = WORD NUMBER OF FIRING UNITS
                OLDFLG IS REFERENCED AS FOLLOWS:
                IF = TYPE OF FIRE            I = FIRING UNIT
                II = RECEIVING UNIT          IW = (I+31)/32 WORD NO
                IB = MOD(I,32) BIT NO FOR I       FOR UNIT I
                THEN:
                THE IB-TH BIT (MOST SIGNIFICANT BIT IS BIT 0) OF
                OLDFLG(IF,II,IW)
                =1 MEANS UNIT I FIRED FIRE OF TYPE IF AT UNIT II
                =0 MEANS UNIT I DID NOT FIRE FIRE OF TYPE IF AT II
                (1<=I<=3,1<=JU<=100,1<=K<=4)

OPE      (IEQ)                     EQINP                            A2
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                  NUMBER OF MEN REQUIRED TO OPERATE EQUIPMENT IEQ
                  IN THREE STATES :  DISMOUNTED,MOUNTED,MAXIMUM
                  CAPACITY. THE THREE VALUES ARE PACKED INTO THE
                  FIRST THREE BYTES OF THE WORD RESPECTIVELY.
                  (1<=IEQ<=80)

PAIR                                                              WEATHR
                  VAPOR PRESSURE AT CURRENT TEMPERATURE AND RELATIVE
                  HUMIDITY

PCPEC   (IEQ)                         EQINP                       A2
                  EXPECTED PERSONNEL CASUALTIES PER EQUIPMENT
                  CASUALTY FOR EQUIPMENT TYPE IEQ  (1<=IEQ<=80)

PCSLR   (JU)                                                      FIRALRT
                  THE I-TH HALF WORD IS A COUNTER OF THE ACCUMULATED
                  PERSONNEL CASUALTIES OF UNIT I SINCE SHELLING STARTS
                  OR SINCE LAST TEMPORARY CASUALTY REPORT (1<=JU<=50)

PCTH                                  NAMELIST                    FIRATH
                  PERSONNEL CASUALTY THRESHOLD.
                  A TEMPORARY CASUALITY REPORT IS GENERATED FOR A UNIT
                  EVERY PCTH*100 PERCENT LOST OF PERSONNEL.
                  COMPARISON IS MADE WITH VARIABLES CPERC AND PCSLR
                  IN COMMON FIRALRT.

PDIR    (IU,J)                        UNINP                       BSTAT
                  DIRECTION FACED BY UNIT IU - STORES AS SIN(J=1),
                  COS(J=2).  CARTESIAN COORDINATE SYSTEM USED.
                  (1<=IU<=100)

PERNVC  (JU,IPVC,K)                                               BLEFT2
                  NUMBER OF PERSONNEL IN EACH VULNERABILITY CLASS
                  IPVC (1<=IPVC<=6) FOR UNIT JU (1<=JU<=100) WHERE K=:
                  1-ACTUAL NUMBER IN PREVIOUS TIME STEP
                  2-ACTUAL NUMBER IN CURRENT TIME STEP
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          3-UNSUPPRESSED NUMBER IN PREVIOUS TIME STEP
          4-UNSUPPRESSED NUMBER IN CURRENT TIME STEP.

PERS    (JU)                                                BOBBY
          NUMBER OF PERSONNEL CURRENTLY IN UNIT JU
          (1<=JU<=100)

PERSI   (JU)                                                BINIT
          INITIAL NUMBER OF PERSONNEL IN UNIT JU (1<=JU<=100)

PERSWT  (JU)                                                BLEFT2
          WEIGHT OF UNIT JU AS A PERSONNEL TARGET (1<=JU<=100)

POSFAC  (IUT,ICOLOR,IFTYP)            UTINP                 C
          IF A TARGET UNIT OF TYPE IUT AND COLOR ICOLOR
          (1 =RED,2 =BLUE) IS IN SPECIAL-THREAT CATEGORY,
          AND A WEAPON IN CATEGORY IFTYP (=KFICTR) IS TO BE
          ALLOCATED, THEN ITS TARGET WEIGHT IS MULTIPLIED BY
          POSFAC (IUT,ICOLOR,IFTYP). (1<=IUT<=20,1<=IFTYPE<=3)

POSWGT                                                      D
          FACTOR TO MULTIPLY TARGET VALUE BY TO REFLECT
          POSITION ADVANTAGE.

PPEREQ                                                      P
          PERSONNEL CASUALTIES PER EQUIPMENT LOSS .

PRSCAN  (IGSR)                        SENSINP               RADARCOM
          PROBABILITY OF ILLUMINATING A SINGLE TARGET WITH
          RADAR IGSR IN ONE MODEL TIME STEP
          (=1/SCAN TIME IN MINUTES)  (1<=IGSR<=6)

PRTB    (I,J)                         TAINP                 D
          X COORDINATES OF POINTS ON TARGET ACQUISITION
```

```
                 PROBABILITY CURVE.  NOT USED IN CATTS.

PTLNTH                                                          ADWDAT
                 LENGTH (IN METERS) OF LETHAL AREA CAUSED BY AIR ORD-
                 NANCE IMPACT

PTWDTH                                                          ADWDAT
                 WIDTH (IN METERS) OF LETHAL AREA CAUSED BY AIR ORD-
                 NANCE IMPACT

PWGT                                                            P
                 WEIGHTED SUM OF PERSONNEL TARGET VALUES.

RDCA     (IGSR)                     SENSINP                     RADARCOM
                 FIRST COEFFICIENT OF QUADRATIC FIT TO THE
                 PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH
                 RADAR TYPE IGSR   (1<=IGSR<=6)

RDCB     (IGSR)                     SENSINP                     RADARCOM
                 SECOND COEFFICIENT OF QUADRATIC FIT TO THE
                 PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH
                 RADAR TYPE IGSR   (1<=IGSR<=6)

RDCC     (IGSR)                     SENSINP                     RADARCOM
                 THIRD COEFFICIENT OF QUADRATIC FIT TO THE
                 PROBABILITY OF NOT DETECTING A SINGLE TARGET WITH
                 RADAR TYPE IGSR   (1<=IGSR<=6)

RDDMGE   (JRDSG)                                                DAMAGE
                 FRACTION OF ROAD SEGMENT JRDSG DAMAGED BY FIRE
                 (1<=JRDSG<=500)

RDMGTHRS                            ROADINP                     DAMAGE
                 DAMAGE THRESHOLD SUCH THAT MOVEMENT ALONG A ROAD IS
```

NOT PERMITTED

RDOTMN (IGSR) SENSINP RADARCOM

MINIMUM DOPPLER THRESHOLDS FOR RADAR
TYPE IGSR (METERS/MINUTES) (1<=IGSR<=6)

RDOTMX (IGSR) SENSINP RADARCOM

MAXIMUM DOPPLER THRESHOLDS FOR RADAR
TYPE IGSR (METERS/MINUTES) (1<=IGSR<=6)

RELCAS P

NUMBER OF EQUIPMENT-RELATED PERSONNEL CASUALTIES.

RERROR ADWDAT

ORDNANCE DELIVERY BALLISTIC ERROR IN THE DIRECTION
OF FLIGHT OF THE AIR UNIT

REVDIES NAMELIST REVEQP

THRESHOLD (IN TERMS OF FRACTION OF INITIAL DIESEL
LOAD) FOR DIESEL LOAD. WHEN CURRENT DIESEL LOAD
OF A UNIT GETS BELOW THIS VALUE A DIESEL RESUPPLY
REQUEST ALERT WILL BE ISSUED BY UNIT.

REVGAS NAMELIST REVEQP

THRESHOLD (IN TERMS OF FRACTION OF INITIAL GASOLINE
LOAD) FOR GASOLINE LOAD. WHEN CURRENT GASOLINE LOAD
OF A UNIT GETS BELOW THIS THRESHOLD A GASOLINE
RESUPPLY REQUEST WILL BE ISSUED BY UNIT.

RH WEATHR

PRESENT RELATIVE HUMIDITY (PER CENT)

RHO (JVEG,J) DATAB1

DENSITY IN FEATURES/METER SQUARE OF EACH OF THE 4

```
          COMPONENTS OF EACH OF THE 16 VEGETATION CLASSES

RMAX                                SENSINP                         DUSER
          MAXIMUM RANGE (IN METERS) FOR GROUND RADAR DETECTION

RMAX      (IVEG,I)                                                  VEGCOMP
          MAXIMUM RANGE AT WHICH LINE OF SIGHT WILL BE
          COMPUTED FOR EACH FEATURE TYPE IN EACH
          VEGETATION CLASS.  NOT USED IN CATTS.
          1<=IVEG<=16, 1<=I<=4.

RNM                                 SENSINP                         RADARCOM
          MINIMUM NUMBER OF RADARS THAT CAN
          EFFECTIVELY BE EMPLOYED

RNOD                                SENSINP                         VISUSER
          MAX. RANGE (IN METERS) FOR THE FIRST  TYPE OF NIGHT
          OPTICAL DEV.

ROFE      (IEQ,IMODE)               EQINP                           A2
          FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
          >=0), RATE OF FIRE OF WEAPON TYPE IEQ IN EACH MODE
          IMODE (ROUNDS/MINUTE)
          FOR AIRCRAFT (IEQCOD(IEQ) = -1),
          IMODE = 1 FUEL EXPENDITURE FOR LOSING ALTITUDE
                    (LB/METER)
                  2 FUEL EXPENDITURE FOR GAINING ALTITUDE
                    (LB/METER)
                  3 FUEL EXPENDITURE AT MINIMUM SPEED, MINIMUM
                    LOAD, BEST PRESSURE DENSITY (LB/MIN)
                  4 FUEL EXPENDITURE AT CRUISE SPEED (LB/MIN)
                  5 FUEL EXPENDITURE AT MAXIMUM SPEED (LB/MIN)
                  6 RATIO OF FUEL EXPENDITURE RATE AT MAXIMUM
                    LOAD TO FUEL EXPENDITURE RATE AT MINIMUM
                    LOAD
                  7 RATIO OF FUEL EXPENDITURE RATE AT WORST
                    PRESSURE DENSITY TO FUEL EXPENDITURE RATE
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                  AT BEST PRESSURE DENSITY
                6 NOT USED
         FOR AIR ORDNANCE (IEQCOD(IEQ) = -2),
         IMODE = 1 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                  ABILITY CLASS 1 (STANDING) AND WITHIN TAR-
                  GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                2 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                  ABILITY CLASS 2 (CROUCHING) AND WITHIN
                  TARGET AREA WHO ARE KILLED BY
                  THIS EQUIPMENT
                3 FRACTION OF PERSONNEL IN PERSONNEL VULNER-
                  ABILITY CLASS 3 (PRONE) AND WITHIN TAR-
                  GET AREA WHO ARE KILLED BY THIS EQUIPMENT
                4 FRACTION OF EQUIPMENT WITH IEQCLS = 1 AND
                  WITHIN TARGET AREA WHICH IS DAMAGED BY
                  THIS EQUIPMENT
                5 FRACTION OF EQUIPMENT WITH IEQCLS = 2 AND
                  WITHIN TARGET AREA WHICH IS DAMAGED BY
                  THIS EQUIPMENT
                6 FRACTION OF EQUIPMENT WITH IEQCLS = 3 AND
                  WITHIN TARGET AREA WHICH IS DAMAGED BY
                  THIS EQUIPMENT
                7 FRACTION OF EQUIPMENT WITH IEQCLS = 4 AND
                  WITHIN TARGET AREA WHICH IS DAMAGED BY
                  THIS EQUIPMENT
                8 FRACTION OF EQUIPMENT WITH IEQCLS = 5 AND
                  WITHIN TARGET AREA WHICH IS DAMAGED BY
                  THIS EQUIPMENT
         (1<=IEQ<=80,1<=IMODE<=8)

ROME    (IEQ,IMODE)                  EQINP                          A2
         FOR GROUND EQUIPMENTS (INDICATED BY IEQCOD(IEQ)
         >= 0), RATE OF MOVEMENT (IN METERS/MINUTE) OF WEAPON
         TYPE I IN MODE IMODE (UNOBSTRUCTED).
         FOR AIRCRAFT (IEQCOD(IEQ) = -1),
         IMODE = 1 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                  AT BEST MODELED PRESSURE DENSITY (PDBEST)
              = 2 MAXIMUM ALTITUED OF AIRCRAFT (METERS)
              = 3 MINIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
              = 4 CRUISE SPEED OF AIRCRAFT (METERS/MINUTE)
              = 5 MAXIMUM SPEED OF AIRCRAFT (METERS/MINUTE)
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                = 6 MAXIMUM LOAD AIRCRAFT CAN CARRY (POUNDS)
                    AT WORST MODELED PRESSURE DENSITY
                    (PDWORST).  THE CORRECT
                    NEGATIVE VALUE WILL INSURE
                    THAT AN AIRCRAFT CANNOT FLY AT PRESSURE
                    DENSITIES BELOW ITS CAPABILITY
                = 7 POOREST METEOROLOGICAL VISIBILITY IN WHICH
                    AIRCRAFT CAN CONTINUE ITS MISSION (METERS)
                = 8 NOT USED
         FOR EQUIPMENT OTHER THAN AIRCRAFT (IEQCOD(IEQ) =
         -2 OR -3),
         IMODE = 1 WEIGHT OF EQUIPMENT (POUNDS) INCLUDING
                    STANDARD AMMUNITION LOAD
                = 2 MINIMUM AIRCRAFT SPEED (METERS/MINUTE) AT
                    WHICH EQUIPMENT CAN BE USED
                = 3 MAXIMUM SPEED AT WHICH EQUIPMENT CAN BE
                    USED (METERS/MINUTE)
                = 4 MINIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE
                    USED (METERS)
                = 5 MAXIMUM ALTITUDE AT WHICH EQUIPMENT CAN BE
                = 6 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
                    CRATER RADIUS (METERS) AGAINST ROAD TYPE 1
                = 7 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
                    CRATER RADIUS (METERS) AGAINST ROAD TYPE 2
                = 8 FOR SENSORS, NOT USED; FOR ORDNANCE, ROAD
                    CRATER RADIUS (METERS) AGAINST ROAD TYPE 3
         (1<=IEQ<=80,1<=IMODE<=8)

ROMMAX                          NAMELIST                        VISUSER
         MAXIMUM MOVING RATE FOR ANY UNIT (METERS PER MINUTE)

ROMMX    (IEQ)                  NAMELIST                        MAXROM
         THE MAXIMUM RATE OF MOVEMENT (IN METERS/MINUTE) FOR
         THE IEQ-TH (1<=IEQ<=80) EQUIPMENT UNDER IDEAL CON-
         DITIONS

ROMU     (JU)                                                   BSTAT
         RATE OF MOVEMENT OF UNIT JU IN METERS PER MINUTE.
         (1<=JU<=100)
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RSLS                            SENSINP                         VISUSER
             MAX. RANGE (IN METERS) FOR THE SECOND TYPE OF NIGHT
             OPTICAL DEV.

RTGT     (IUT)                  UTINP                           VISUSER
             THE REFLECTANCE FOR THE TYPE IUT UNIT (1<=IUT<=20)

RTTABLE (K,I)                   SENSINP                         VISUALIN
             GIVES THE SINGLE GLIMPSE VISUAL DETECTION PROB-
             ABILITY FOR A SITUATION WHERE THE CONTRAST
             RATIO EQUALS RTTABLE(1,I).  LINEAR INTERPOLATION
             IS DONE FOR UNEQUAL VALUES (1<=K<=2,1<=I<=15)

SCANFAC                         SENSINP                         VISUALIN
             THE FACTOR TO ADJUST THE SCAN SECTOR USED FOR
             VISUAL DETECTION OBSERVER UNIT RECEIVES AN
             AURAL DETECTION CUE.

SIGENG   (JU)                                                   HFACTOR
             TOTAL ENERGY EXPENDED SINCE THE START OF THE
             SIMULATION BY A SINGLE PERSON IN THE JU-TH
             UNIT;  THIS NUMBER IS USED TO COMPUTE AN OVERALL
             HUMAN DEGRADATION EFFECT FOR THE JU-TH UNIT
             (1<=JU<=100)

SIGRADMX                        NAMELIST                        RADARCOM
             MAXIUM ALLOWABLE SUPPRESSION FOR A UNIT TO HAVE AND
             STILL USE RADAR

SIGTAB   (I,J)                  SIGINP                          Q
             THE I TH ENTRY IN THE SUPPRESSION TABLE(1<=I<=40).
             WHERE EACH ENTRY HAS 6 POINTS(1<=J<=6)DESCRIBING
             THE SUPPRESSION CURVE .
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```
SIGU     (JU)                    UNINP                      BLEFT1
             SUPPRESSION FACTOR: FRACTION OF MEN IN UNIT
             JU WHO ARE SUPPRESSED.  (1<=JU<=100)
             ZEROED OUT IN UNIT INPUT DECK.

SLOPET   (JU)                                               PROBLOS
             THE INSTANTANEOUS TERRAIN SLOPE FOR UNIT JU
             (1<=JU<=100)

SLOPE1                                                      OBCHECK
             THE TANGENT OF THE LINE DESCRIBING THE PATH OF MOVE-
             MENT DURING THE CURRENT TIME STEP FOR A GIVEN UNIT

SLPEMX   (IEQ)                   NAMELIST                   EQUIP
             THE MAXIMUM SLOPE THAT THE IEQ-TH (1<=IEQ<=80)
             EQUIPMENT CAN NEGOTIATE

SOIL     (ISOIL,J)               SENSINP                    SOILIN
             CHARACTERISTC DATA FOR SOIL TYPE ISOIL
             (1<=ISOIL<=15):
             J=1  FOR RCI INDEX WHEN THE SOIL IS DRY
             J=2  FOR RCI INDEX WHEN THE SOIL IS WET
             J=3  PERFORMANCE FACTOR FOR THE UGS TYPE 1
             J=4  PERFORMANCE FACTOR FOR THE UGS TYPE 2
               :
               :
             J=12 PERFORMANCE FACTOR FOR THE UGS TYPE 10
             J=13 THE REFLECTANCE OF SOIL TYPE ISOIL

SR                               SENSINP                    VISUSER
             SCAN RATE FOR THE HUMAN EYE

SSV                              SENSINP                    VISUSER
             NORMAL SCAN SECTOR FOR VISUAL DETECTION
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STATS   (JEQ,J,JCOLOR)                                                  MSCLAN
                  EQUIPMENT AND PERSONNEL CASUALTY STATISTICS FOR RED
                  KILLING BLUE (JCOLOR=1), AND BLUE KILLING RED
                  (JCOLOR=2) EQUIPMENTS.  JEQ=1,40 CORRESPONDS TO
                  NDXSTATS(JEQ,JCOLOR).  J=1,41 CORRESPONDS TO
                  NDXSTATS(J,3-JCOLOR), WHERE J=41 IS USED FOR
                  PERSONNEL CASUALTIES

STT     (JU)                                                            FIRALRT
                  THE I-TH HALF WORD OF STT STORES TIME IN MINUTES
                  AT WHICH FIRING OF UNIT I STARTS.
                  -1 IS STORED IF UNIT I HAS NOT STARTED
                  AN ENGAGEMENT.  (1<=JU<=50)

SWFU    (JU)                                                            BLEFT2
                  AREA SUPPORT FIRE WEAPON ROUNDS/UNIT TIME
                  RECEIVED BY UNIT JU.  (1<=JU<=100)

TASK    (IOBST)                        NAMELIST                         ENGFACT
                  TIME DELAY ASSESSED AGAINST A UNIT BY AN OBS-
                  TACLE OF TYPE IOBST (1<=IOBST<=10) EXPRESSED IN
                  TERMS OF MANHOUR PER METER

TCTABLE (I,J)                          SENSINP                          VISUSER
                  THE THRESHOLD CONTRAST VALUES(SEE MATH MODEL REPORT)
                   I - REPRESENTS THE LIGHT LEVELS
                   J - REPRESENTS THE ANGULAR SUBTENSE OF TARGET
                  (1<=I<=31,1<=J<=10)

TCTR                                                                    R
                  REMAINING FRACTION OF TIME LEFT FOR MOVEMENT OF A
                  UNIT DURING TIME STEP;ALSO USED FOR TEMP. STORAGE.

TCTRMX                                                                  DGRONOFF
                  MAXIMUM RATE OF MOVEMENT CONSTRAINED BY ENVIRONMENT-
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           AL DEGRADATION FACTORS FOR A GIVEN UNIT

TEMP                                                         WEATHR
           PRESENT TEMPERATURE (DEGREES F)

TOTAMT                                                       P
           NUMBER OF TARGET ELEMENTS IN TARGET UNITS , EITHER
           PERSONNEL OR EQUIPMENT .

THS                          SENSINP                         AURALIN
           THRESHOLD HEARING LEVEL (IN DB) FOR THE OBSERVER.

TIME                                                         TIMES
           TIME (IN FLOATING POINT MINUTES)

TIMXY   (JAIRTE,JAU)                                         AIRLOC
           TIME AT WHICH AIR UNIT JAU REACHES JAIRTE-TH POINT
           IN THIS MINUTE.  (1<=JAIRTE<=8,1<=JAU<=10)

TIMXYFG (JAIRTE,JAU)                                         FGAIRLOC
           TIME AT WHICH AIR UNIT JAU REACHED JAIRTE-TH
           POINT IN PRECEDING MINUTE.  USED BY THE FORE-
           GROUND PROGRAMS.  (SEE IXAIRFG).  (1<=JAIRTE<=8,
           1<=JAU<=10)

TOTEQU  (IU,J)               UNINP                           BOBBY
           TOTAL NUMBER OF PIECES REMAINING OF J-TH
           EQUIPMENT TYPE CARRIED BY UNIT IU.
           (1<=IU<=100,1<=J<=14)

TPCAS   (JU)                                                 FIRALRT
           THE JU-TH HALF WORD IS A COUNTER OF THE TOTAL PER-
           SONNEL CASUALTIES FOR UNIT JU SINCE FIRING STARTS
           (1<=JU<=50)
```

IROFE	RATE OF FIRE TO BE USED BY A ROUNDS/MINUTE COMMAND		FIRORG
TROUNDS	TOTAL ROUNDS TO BE FIRED FROM A WEAPON USING THE ROUNDS/MINUTE FIRE CONTROL OPTION		FIRORG
TSR	TIME OF SUNRISE (HOURS AND MINUTES)	NAMELIST	WTHDAT
TSRX	TIME OF SUNRISE (DECIMAL HOURS)		WTHDAT
TSS	TIME OF SUNSET (HOURS AND MINUTES)	NAMELIST	WTHDAT
TSSX	TIME OF SUNSET (DECIMAL HOURS)		WTHDAT
TSTEPSEC	TIME STEP IN SECONDS .	SENSINP	VISUALIN
TTCOEFF	CONSTANT COEFFICIENT WHICH IS USED IN THE CALCULATION OF SUBTENSE ANGLE IN VISUAL DETECTION	SENSINP	VISUALIN
TVAL	TOTAL TARGET VALUE (WITH RESPECT TO GIVEN WEAPON TYPE) OF CORRESPONDING TARGET SET. (WEIGHTED SUMS OF PERSONNEL OR EQUIPMENT TARGETS FOR WEAPON TYPES.)		D

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TVOLFIR                                                              PRINTFIR
                 FOR DIRECT AND INDIRECT FIRE WEAPONS, THE TOTAL
                 NUMBER OF ROUNDS FIRED IN ALL MODES AGAINST A GIVEN
                 TARGET, TO BE STORED IN IAMT ARRAY;
                 FOR OTHER WEAPONS, NOT USED.

TVS2CON (I,J)                        SENSINP                         VISUALIN
                 THE I TH CONSTANT COEFFICIENT FOR THE FORMULA TO
                 CALCULATE THE PROBABILITY OF DETECTION FOR TVS2
                 UNDER DIFFERENT NIGHT CONDITIONS J (1<=I<=5):
                   J=1    STAR LIGHT
                   J=2    1/4 MOON
                   J=3    1/2 MOON
                   J=4    FULL MOON
                   J=5    TWILIGHT

TVS2MAX (I)                          SENSINP                         VISUALIN
                 MAXIMUM DETECTING RANGE (IN METERS) FOR THE TVS2
                 UNDER DIFFERENT NIGHT CONDTIONS I :
                   I=1    STAR LIGHT
                   I=2    1/4 MOON
                   I=3    1/2 MOON
                   I=4    FULL MOON
                   I=5   TWILIGHT

TVS2MIN (I)                          SENSINP                         VISUALIN
                 THE RANGE (IN METERS) FOR THE TVS2 WHERE DETECTION
                 PROBABILITY IS ASSUMED TO BE 100 PER CENT UNDER
                 DIFFERENT NIGHT CONDITIONS I :
                   I=1    STAR LIGHT
                   I=2    1/4 MOON
                   I=3    1/2 MOON
                   I=4    FULL MOON
                   I=5    TWILIGHT

TVS4CON (I)                          SENSINP                         VISUALIN
                 THE I TH COEFFICIENT FOR THE PROBABILITY OF
                 DETECTION CURVE FOR THE TVS4 (1<=I<=5)
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TVS4MAX                                  SENSINP                          VISUALIN
               MAXIMUM DETECTION RANGE (IN METERS) FOR TVS4

TVS4RCON                                 SENSINP                          VISUALIN
               CONVERT TVS4 RANGE UNITS TO METERS

TYPFAC   (IUT,ICOLOR)                    UTINP                            C
               WEIGHTING FACTOR FOR UNIT TYPE IUT, RED(ICOLOR=1)
               OR BLUE(ICOLOR=2), THAT EXPRESSES IMPORTANCE OF
               UNIT AS A SUPPORT FIRE TARGET.  (1<=IUT<=20)

UA       (JU)                                                             BLEFT2
               TOTAL WEIGHTED TARGET VALUE OF UNIT JU (SOME-
               TIMES USED AS TEMPORARY STORAGE).  (1<=JU<=100)

UASFRS   (IUGS,ICOLOR)                   SENSINP                          UASF
               RADIUS FOR THE IUGS-TH UGS FIELD IN METERS
               (1<=IUGS<=10)
                ICOLOR=1 RED FORCE
                ICOLOR=2 BLUE FORCE

UASFX    (IUGS,ICOLOR)                   SENSINP                          UASF
               X-COORDINATE FOR IUGS TH UGS FIELD IN METERS
               (1<=IUGS<=10)
                ICOLOR=1 RED FORCE
                ICOLOR=2 BLUE FORCE

UASFY    (IUGS,ICOLOR)                   SENSINP                          UASF
               Y-COORDINATE FOR IUGS TH UGS FIELD IN METERS
               (1<=IUGS<=10)
                ICOLOR=1 RED FORCE
                ICOLOR=2 BLUE FORCE
```

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UASNAME (I,IUGST)                               SENSINP                        UASF
                THE I-TH WORD FOR THE NAME OF THE UGS TYPE IUGST
                (1<=I<=3,1<=IUGST<=10)

UASTRS  (IUGST,I)                               SENSINP                        UASF
                THE RANGE (IN METERS) FOR THE UGS TYPE IUGST
                (1<=IUGST<=10)
                 I=1  IF THE UNIT BEING DETECTED WILL NOT
                      PRODUCE MORE NOISE THAN A TRUCK.
                 I=2  OTHERWISE

UBE     (IEQ)                                   EQINP                          A2
                WEIGHING FACTOR: IMPORTANCE OF EQUIPMENT
                TYPE IEQ AS A TARGET.  (1<=IEQ<=80)

UELEV   (JU)                                                                   PROBLOS
                THE ELEVATION (IN METERS) OF UNIT JU.  (1<=JU<=100)

UNNAME  (I,IU)                                  UNINP   LGINP   CMDUNINP       NAMES
                12 CHARACTER NAME ASSOCIATED WITH EACH OF IU(1-150)
                UNITS (1<=I<=3)

USEEQU  (JU,J)                                                                 BLEFT2
                NUMBER OF PIECES MANNED FOR THE J-TH EQUIPMENT
                TYPE CARRIED BY UNIT JU.  (1<=JU<=100,1<=J<=14)

VA      (JU)                                                                   BLEFT2
                WEIGHTED VALUE OF TARGET ELEMENTS DETECTED
                IN UNIT JU (SOMETIMES USED AS TEMPORARY
                STORAGE).  (1<=JU<=100)

VCI     (IEQ)                                   NAMELIST                       EQUIP
                VEHICLE CONE INDEX FOR THE IEQ-TH (1<=IEQ<=80)
                EQUIPMENT
```

```
VEG      (IVEG,J)                    SENSINP                         VEGVIS
                   J=1   THE PERCENTAGE OF AREA WHICH IS NOT BARE
                         SOIL FOR THE VEGETATION CLASS IVEG
                   J=2   THE REFLECTANCE OF THE VEGETATION CLASS IVEG
                   (1<=IVEG<=16)

VISLUM   (IWC,J)                                                     WTHDAT
                   VISIBILITY AND ILLUMINATION DATA FOR WEATHER CLASS
                   IWC (1<=IWC<=8)
                     J=1   METEOROLOGICAL VISIBILITY (METERS)
                       2   AMBIENT LIGHT LEVEL(FT-LAM.)-DAYLIGHT
                       3   AMBIENT LIGHT LEVEL(FT-LAM.)-SUNRISE
                       4   AMBIENT LIGHT LEVEL(FT-LAM.)-SUNSET
                       5   AMBIENT LIGHT LEVEL(FT-LAM.)-NIGHT-NO MOON
                       6   AMBIENT LIGHT LEVEL(FT-LAM.)-NIGHT-1/4 MOON
                       7   AMBIENT LIGHT LEVEL(FT-LAM.)-NIGHT-1/2 MOON
                       8   AMBIENT LIGHT LEVEL(FT-LAM.)-NIGHT-FULL MOON

VISM                                                                 WEATHR
                   GLOBAL METEOROLOGICAL VISIBILITY (METERS)

VMAX                                 SENSINP                         DUSER
                   MAXIMUM RANGE (IN METERS) FOR VISUAL DETECTION.

VOLFIR                                                               P
                   TOTAL VOLUME OF FIRE (ROUNDS/UNIT TIME)

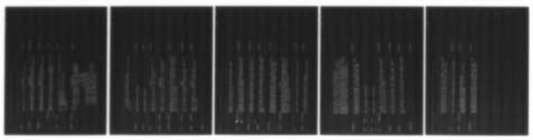
[illegible]                          SENSINP                         VISUSER
                   MAXIMUM RANGE (IN METERS) FOR THE FIRST TYPE OF
                   BINOCULAR

[illegible]                          SENSINP                         VISUSER
                   MAXIMUM RANGE (IN METERS) FOR THE SECOND TYPE OF
                   BINOCULAR
```

AD-A038 799 TRW DEFENSE AND SPACE SYSTEMS GROUP REDONDO BEACH CALIF F/G 15/3
MATHEMATICAL MODEL USER'S MANUAL COMBINED ARMS TACTICAL TRAININ--ETC(U)
JAN 77 D S ADAMSON, E C ANDREANI, G W ARCHER N61339-73-C-0156

UNCLASSIFIED NAVTRAEQUIPC-73-C-0156-E00 NL

4 OF 4
AD
A038799



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DATE
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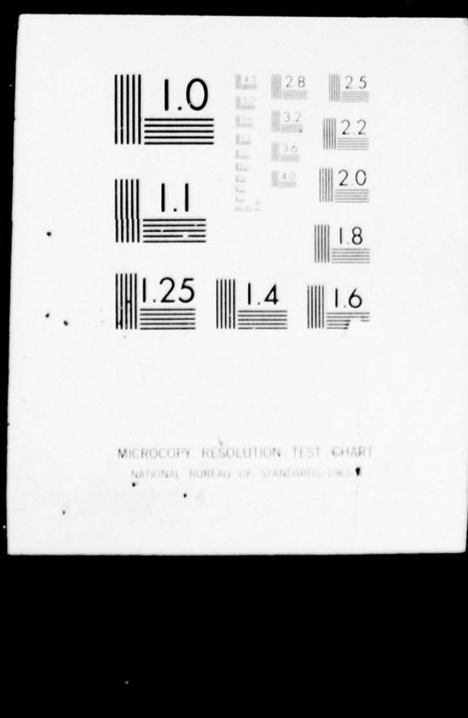
5-77

4 OF 4

AD A038799



```
VRE                              SENSINP                                  VISUSER
              MAXIMUM RANGE (IN METERS) FOR THE NAKED EYES

VSDEG1                           NAMELIST                                 VISIBLE
              MOVEMENT DEGRADATION FACTOR APPLIED WHEN
              METEOROLOGICAL VISIBILITY IS LESS THAN 600 METERS

VSDEG2                           NAMELIST                                 VISIBLE
              MOVEMENT DEGRADATION FACTOR APPLIED WHEN
              METEOROLOGICAL VISIBILITY IS LESS THAN 100 METERS

W       (IVEG,I)                                                          DATAB1
              WIDTH IN METERS OF EACH OF THE 4 COMPONENTS (I) OF
              EACH OF THE 16 VEGETATION CLASSES (IVEG)

WCIR    (I,J)                                                             WEATHR
              I=1  METEOROLOGICAL VISIBILITY (IN METERS) FOR LOCAL
                   WEATHER AREA J
              I=2  AMBIENT LIGHT LEVEL FOR LOCAL
                   WEATHER AREA J
              (1<=J<=10)

WDAY    (I,J)                    NAMELIST                                 WTHDAT
              DAILY WEATHER INFORMATION FOR THE I TH DAY .
               J=  1 TIME OF MOONRISE (HOURS AND MINUTES)
                   2 TIME OF MOONSET (HOURS AND MINUTES)
                   3 TYPE OF MOON - 0 = NEW MOON
                                    1 = 1/4 MOON
                                    2 = 1/2 MOON
                                    3 = FULL MOON
                   4 MAXIMUM TEMPERATURE (DEG. F)
                   5 MINIMUM TEMPERATURE (DEG. F)
                   6 MAXIMUM RELATIVE HUMIDITY ( PER CENT)
                   7 MINIMUM RELATIVE HUMIDITY (PER CENT)
                   8 MINIMUM WIND VELOCITY (KTS)
                   9 AVERAGE WIND VELOCITY (KTS)
```

		10 MAXIMUM WIND VELOCITY (KTS) 11 DIRECTION WIND IS COMING FROM (0 -360 DEG.) (1<=I<=10)	
WIDIR		WIND DIRECTION (DEGREES)	WEATHR
WIVEL		WIND VELOCITY (KNOTS)	WEATHR
WNI		SENSINP INCREMENTAL WIND NOISE FACTOR (IN DB/KNOT) FOR THE DOMINANT VEGETATION FOR THIS SCENARIO.	AURALIN
WPVC	(IPVC)	MISCVAR WEIGHT OF A MAN AS A TARGET ELEMENT FOR EACH PERSONNEL VULNERABILITY CLASS IPVC. (1<=IPVC<=6)	D
WTFCTR	(IPVC)	WEIGHTING FACTOR USED BY SUBROUTINE STEP TO DISTRIBUTE PERSONNEL CASUALTIES TO VULNERABILITY CLASSES OTHER THAN CLASS 1, WHICH IS INVULNERABLE (IPVC=1,5 FOR 6 POSSIBLE CLASSES)	WEIGHT
WU	(IUT)	UTINP THE EFFECTIVE WIDTH (IN METERS) FOR THE TYPE IUT UNIT FOR VISUAL DETECTION (1<=IUT<=20)	VISUSER
WUN	(IUT)	UTINP WIDTH IN METERS OF A SINGLE ELEMENT OF A UNIT OF TYPE IUT FOR LINE OF SIGHT CALCULATIONS (1<=IUT<=20)	UNWDHD
WVAL			D

```
          NUMBER OF WEAPONS OF THE TYPE CONSIDERED THAT
          ARE IN USE IN WEAPON SET .

XB      (JOBS,J)                                                INTERSCT
          X-COORD. OF THE INTERSECTION BETWEEN THE UNIT PATH
          OF TRAVEL AND THE J-TH (1<=J<=12) SEGMENT OF THE
          JOBS-TH (1<=JOBS<=50) OBSTACLE

XDEST                                                           DSTNTION
          X-COORD. OF DESTINATION POINT THAT A GIVEN UNIT IS
          TRAVELING TOWARDS DURING THE CURRENT TIME STEP

XDESX                                                           OBCHECK
          THE X COORD. OF THE DESTINATION POINT WHICH A GIVEN
          UNIT IS TRYING TO MOVE TO DURING THE CURRENT TIME
          STEP

XINITIAL                                                        OBCHECK
          THE MINIMUM VALUE BETWEEN THE X COORD. OF THE UNIT
          CURRENT LOCATION AND THE X COORD. OF THE UNIT
          DESTINATION POINT DURING THE CURRENT TIME STEP

XMUTAB  (I,IMODE)                    MUINP                      C
          MODE DISTRIBUTION VECTORS.  XMUTAB(I,IMODE) IS THE
          FRACTION OF EQUIPMENT OPERATING IN MODE IMODE
          WHEN MODE DISTRIBUTION VECTOR I HAS BEEN SELECTED
          BY USE OF TABLES MUSLCT AND MURTAB.
          1<=I<=80, 1<=IMODE<=8.

XP                                                              OBCHECK
          THE X COORD. OF CURRENT LOCATION OF A GIVEN UNIT

XPOLY   (I,IVPOL)                                               DATAVEG
          X - COORDINATES IN METERS DEFINING
          EACH VEGETATION POLYGON. FOR TRIANGULAR POLYGON L
```

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                    (XPOLY (1,L), YPOLY(1,L)), (XPOLY(2,L),
                    YPOLY(2,L)) AND (XPOLY(3,L), YPOLY(3,L) ARE THE
                    THREE VERTICES. FOR RECTANGULAR POLYGON L (XPOLY
                    (1,L), YPOLY(1,L)) AND XPOLY(2,L), YPOLY(2,L)) ARE
                    TWO VERTICES AND XPOLY(3,L) IS THE LENGTH OF THE
                    POLYGON IN THE OTHER DIMENSION. FOR CIRCULAR POLYGON
                    (XPOLY(1,L), YPOLY(1,L)) IS THE CENTER AND
                    XPOLY(3,L) IS THE RADIUS (1<=I<=5,1<=IVPOL<=225)

XTERMNAL                                                                OBCHECK
                    THE MAXIMUM VALUE BETWEEN THE X COORD. OF THE UNIT
                    CURRENT LOCATION AND THE X COORD. OF THE UNIT
                    DESTINATION POINT DURING THE CURRENT TIME STEP

XUA       (JU)                                                          G
                    TEMP. STORAGE  (1<=JU<=20)

XVA       (JU)                                                          G
                    TEMP. STORAGE  (1<=JU<=20)

YB        (JOBS,J)                                                      INTERSCT
                    Y-COORD. OF THE INTERSECTION BETWEEN THE UNIT PATH
                    OF TRAVEL AND THE J-TH (1<=J<=12) SEGMENT OF THE
                    JOBS-TH (1<=JOBS<=50) OBSTACLE

YDEST                                                                   DSTNTION
                    Y-COORD. OF DESTINATION POINT THAT A GIVEN UNIT IS
                    TRAVELING TOWARDS DURING THE CURRENT TIME STEP

YDESY                                                                   OBCHECK
                    THE Y COORD. OF THE DESTINATION POINT WHICH A GIVEN
                    UNIT IS TRYING TO MOVE TO DURING THE CURRENT TIME
                    STEP

YINITIAL                                                                OBCHECK
```

```
            THE MINIMUM VALUE BETWEEN THE Y COORD. OF THE UNIT
            CURRENT LOCATION AND THE Y COORD. OF THE UNIT
            DESTINATION POINT DURING THE CURRENT TIME STEP

YP                                                                  DBCHECK
            THE Y COORD. OF CURRENT LOCATION OF A GIVEN UNIT

YPOLY    (I,IVPOL)                                                  DATAVEG
            Y - COORDINATE IN METERS DEFINING
            EACH VEGETATION POLYGON.  (SEE DEF. OF XPOLY)
            (1<=I<=5,1<=IVPOL<=225)

YTERMNAL                                                            DBCHECK
            THE MAXIMUM VALUE BETWEEN THE Y COORD. OF THE UNIT
            CURRENT LOCATION AND THE Y COORD. OF THE UNIT
            DESTINATION POINT DURING THE CURRENT TIME STEP
```